WILDLAND FIRE MANAGEMENT PLAN

HANFORD REACH NATIONAL MONUMENT /

SADDLE MOUNTAIN NATIONAL WILDLIFE REFUGE

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EXECUTIVE SUMMARY

This plan is written to provide guidelines for appropriate suppression and prescribed fire programs at the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge (hereinafter refered to as the Monument). Prescribed fires may be used to reduce hazard fuels, restore the natural processes and vitality of ecosystems, improve wildlife habitat, remove or reduce non-native species, and/or conduct appropriate research projects.

A Presidential proclamation on June 9, 2000 established the Monument (Fed. Reg., Vol. 65, No. 114, pp. 37253-7). The proclamation states that the Monument is "a unique and biologically diverse landscape, encompassing an array of scientific and historic objects [and] contains irreplaceable natural and historic legacy...[The Monument] contains the largest remnant of the shrub-steppe ecosystem that once blanketed the Columbia River Basin."

When approved, this document will become the fire management plan for the U.S. Fish and Wildlife Service (FWS) administered portion of the Monument. Major components include:

– establish policy for prescribed fires at Monument.

– apply guidance for fire management activities provided by the FWS Fire Management Handbook (FMH) (Release Date 6/1/00 and amended 2/28/01).

INTRODUCTION

This is the Fire Management Plan for the lands managed by the Fish and Wildlife Service (FWS) at the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge, hereafter referred to as the Monument (fig. 1). A Presidential proclamation on June 9, 2000 established the Monument (Fed. Reg., Vol. 65, No. 114, pp. 37253-37257). The proclamation states that the Monument is "a unique and biologically diverse landscape, encompassing an array of scientific and historic objects [and] contains irreplaceable natural and historic legacy...[The Monument] contains the largest remnant of the shrub-steppe ecosystem that once blanketed the Columbia River Basin." An Environmental Assessment for this plan was issued on April 3, 2001 (Appendix I). A finding of no significant impact was issued in June, 2001. This plan will meet the requirements of the National Environmental Protection Act (NEPA) and the National Historic Preservation Act (NHPA).

This plan is an operational guide for managing both the Monument's wildland and prescribed fire programs. The plan defines levels of protection needed to promote firefighter and public safety, protect facilities and resources, and restore and perpetuate natural processes, given current understanding of the complex relationships in natural ecosystems. The plan complies with a service-wide requirement that refuges with burnable vegetation develop a fire management plan (620 DM 1).

This plan details both wildland fire suppression and prescribed fire application on the Monument. The Monument will suppress all wildland fires using appropriate management strategies. Prescribed fire will reduce hazardous fuels and/or improve wildlife habitat through the preparation of prescribed fire plans.

The Monument relies upon interagency cooperation from other FWS offices, the Hanford Fire Department, the signatory agencies to the Tri-County Mutual Aid Agreement, and the state and federal agencies available from the Central Washington Interagency Communication Center.

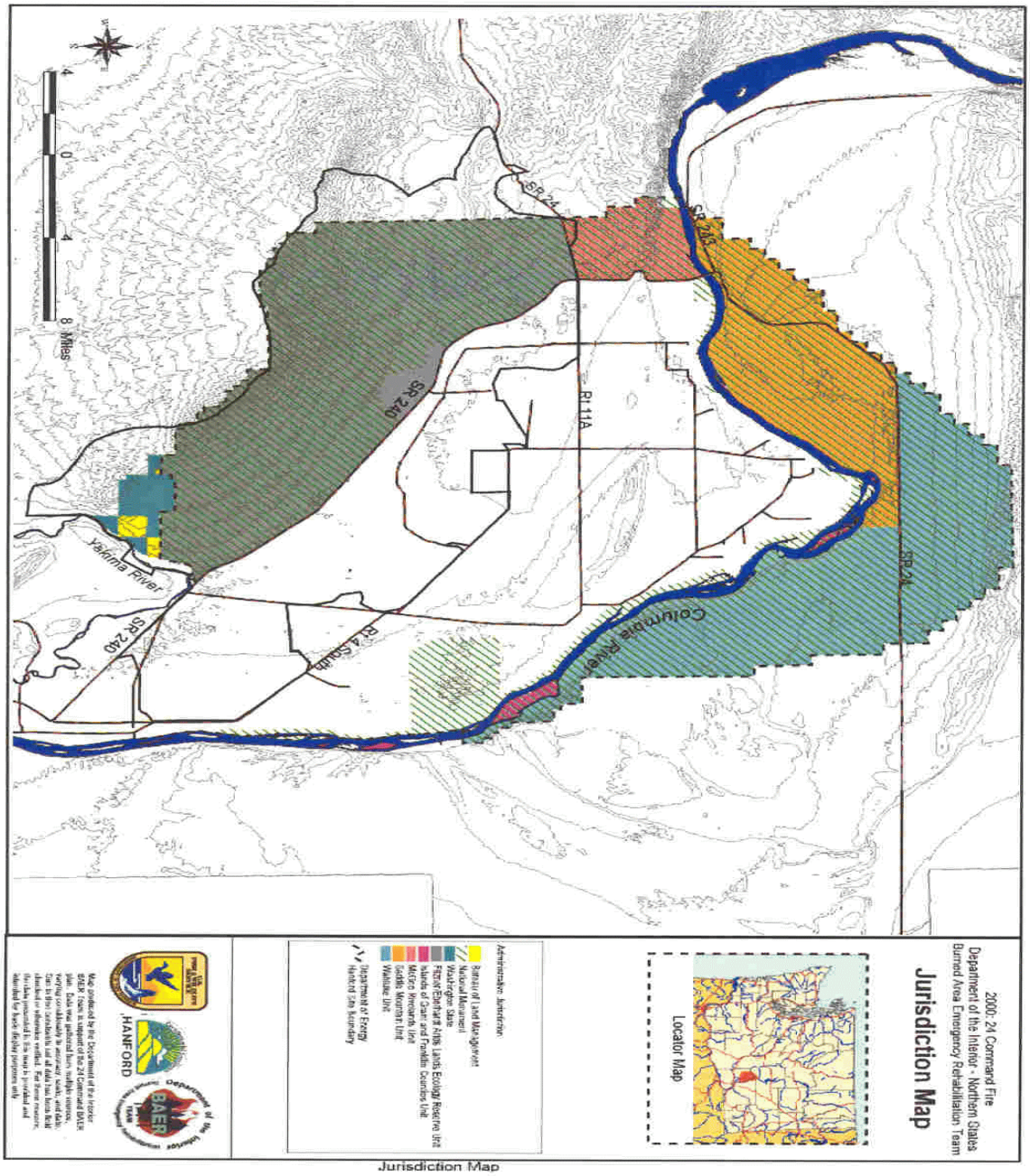


Figure 1. The Hanford Reach National Monument showing the management units.

COMPLIANCE WITH USFWS POLICY

The Department Manual, DM 910 (USDI 1997) states the following regarding wildland fires:

> "Wildfires may result in loss of life, have detrimental impacts upon natural resources, and damage to or destruction of man-made developments. However, the use of fire under carefully defined conditions is to be a valuable tool in wildland management. Therefore, all wildfires within the Department will be classified either as wildfire or as prescribed fires.
> Wildfires, whether on lands administered by the Department or adjacent thereto, which threaten life, man-made structures, or are determined to be a threat to the natural resources or the facilities under the Department's jurisdiction, will be considered emergencies and their suppression given priority over normal Departmental programs.
>
> "Bureaus will give the highest priority to preventing the disaster fire - the situation in which a wildfire causes damage of such magnitude as to impact management objectives and/or socio-economic conditions of an area. However, no wildfire situation, with the possible exception of threat to human survival, requires the exposure of firefighters to life threatening situations. Within the framework of management objective and plans, overall wildfire damage will be held to the minimum possible giving full consideration to (1) an aggressive fire prevention program; (2) the least expenditure of public funds for effective suppression; (3) the methods of suppression least damaging to resources and the environment; and (4) the integration of cooperative suppression actions by agencies of the Department among themselves or with other qualified suppression organizations.
>
> "Prescribed fires...may be used to achieve agency land or resource management objectives as defined in the fire management plans....Prescribed fires will be conducted only when the following conditions are met:
>
> a. Conducted by qualified personnel under written prescriptions.
> b. Monitored to assure they remain within prescription.
>
> Prescribed fires that exceed the limits of an approved prescribed fire plan will be reclassified as a wildfire. Once classified a wildfire, the fire will be suppressed and will not be returned to prescribed fire status."

The authority for funding (normal fire year programming) and all emergency fire accounts is found in the following authorities:

- Section 102 of the General Provisions of the Department of Interior's annual Appropriations Bill provides the authority under which appropriated monies can be expended or transferred to fund expenditures arising from the emergency prevention and suppression of wildland fire.
- P.L. 101-121, Department of the Interior and Related Agencies Appropriation Act of 1990, established the funding mechanism for normal year expenditures of funds for fire management purposes.
- 31 US Code 665(E)(1)(B) provides the authority to exceed appropriations due to wildland fire management activities involving the safety of human life and protection of property.

Authorities for procurement and administrative activities necessary to support wildland fire suppression missions are contained in the Interagency Fire Business Management Handbook.

The Reciprocal Fire Protection Act of May 27, 1955 (42 USC 815a; 69Stat 66) provides Authorities to enter into agreements with other Federal bureaus and agencies; with state, county, and municipal

governments; and with private companies, groups, corporations, and individuals regarding fire activities.

Authority for interagency agreements is found in "Interagency Agreement between the Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service of the United States Department of the Interior and the Forest Service of the United States Department of Agriculture" (1996).

The statutory authorities for fire management on FWS lands are as follows:

> The Protection Act of September 20, 1922 (42 Stat. 857:16 USC 594), which authorizes the Secretary of the Interior not only to protect Departmental land from fire, but also to cooperate with both Federal and state agencies, as well as private land-owners.
>
> The Economy Act of June 30, 1932 (47 Stat. 417; 31 U.S.C. 1535), which authorizes Federal agencies to enter into contracts and agreements for services with each other.
>
> The Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856a) as amended by The Wildfire Suppression Assistance Act of 1989 (102 Stat. 1615), which authorizes reciprocal fire protection agreements with any fire organization for mutual aid, with or without reimbursement, and allows for emergency assistance in the vicinity of agency facilities in extinguishing fires when no agreement exists.
>
> The National Wildlife Refuge System Administration Act of 1966, as amended by The National Wildlife Refuge System Improvement Act of 1997 and The Refuge Recreation Act of 1962 (80 Stat.927) (16 U.S.C. 668dd-668ee) (16 U.S.C. 460K-460k4), which governs the administration and use of the National Wildlife Refuge System.
>
> Disaster Relief Act of May 22, 1974 (88 Stat.143; 42 U.S.C. 5121), which authorizes Federal agencies to assist State and local governments during emergency or major disaster by direction of the President.
>
> Federal Fire Prevention and Control Act of October 19, 1974 et seq. (88 Stat. 1535; 15 U.S.C. 2201) as amended, which authorizes reimbursement to State and local fire services for costs incurred in firefighting on Federal Property.
>
> Federal Grants and Cooperative Act of 1977 (Pub. L. 95-244, as amended by Pub. L. 97-258, September 13, 1982. 96 Stat. 1003; 31 U.S.C. 6301-6308), which eliminates unnecessary administrative requirements on recipients of Government awards by characterizing the relationship between executive agencies and contractors, States and local governments and other recipients in acquiring property and services in providing U. S. Government assistance.
>
> Supplemental Appropriation Act of September 10, 1982 (96 Stat. 837), which authorizes both the Secretary of the Interior and the Secretary of Agriculture to enter into contracts with State and local government entities, including local fire districts, for procurement of services in pre-suppression, detection and suppression of fires on any unit within their jurisdiction.

The Saddle Mountain NWR was established through a permit signed in 1971. An updated permit and

Memorandum of Agreement with DOE for management on the Fitzner-Eberhardt Arid Lands Ecology Reserve was signed in 1997. Saddle Mountain NWR was expanded in 1999 through a Record of Decision. Also in 1999, the Columbia River Islands were transferred from McNary NWR. All of these permitted lands (documents available at the Monument office) were consolidated when the Monument was established in 2000.

In 1999, the Hanford Comprehensive Land-Use Plan (CLUP) and Environmental Impact Statement (EIS), which covered the Monument lands, was issued. Pending completion of a Comprehensive Conservation Plan (CCP) for the Monument, the FWS has adopted DOE's CLUP/EIS by Record of Decision. The CLUP's highest priority for FWS-administered lands is to preserve shrub-steppe habitat and associated biological and ecological resources, as well as to preserve significant cultural and aesthetic resources. Lacking the CCP and this plan, fire management had been based upon a Facility Management Plan (PNL 1993) that advocated "fighting fires along existing fire breaks, roadways, and near buildings (p. 4.7)."

Strategies from DM 1.6:

A. Within the framework of land use objectives and plans, overall wildland fire benefits will be maximized and damages minimized giving full consideration to the following within each appropriate management response:

(1) Firefighter and public safety. No wildland fire situation, with the possible exception of threat to human survival, requires the exposure of firefighters to life-threatening situations.

(2) Implementing a protective and effective wildland fire education/prevention/trespass program.

(3) Prudent expenditure of public funds.

(4) Impact on natural and cultural resources and the environment.

(5) Integrating cooperative wildland fire management actions with other bureaus or with other qualified wildland fire management organizations.

(6) Timely emergency fire rehabilitation/burned area emergency rehabilitation (EFR/BAER) and repair of fire suppression activity damage is performed within acceptable practices consistent with bureau policies and guidelines.

B. Wildland fires, whether on or adjacent to lands administered by the Department, which threaten life, improvements, or are determined to be a threat to natural and cultural resources or improvements under the Department's jurisdiction, will be considered emergencies and their suppression given priority over other Departmental programs.

C. In all cases where wildland fires could cross boundaries between lands administered by more than one agency or landowner, appropriate cooperative documents will be prepared.

D. If a wildland fire escapes initial management action or a prescribed fire should exceed prescription, further actions will be determined to achieve land and fire management objectives through an analysis of alternative management strategies using the Wildland Fire Situation Analysis (WFSA).

E. Bureaus shall cooperate in the development of interagency preparedness plans to ensure timely recognition of approaching critical wildland fire situations; to establish processes for analyzing situations and establishing priorities, and for implementing appropriate management responses to these situations.

F. The agency administrator certifies daily that the selected management actions are appropriate and the necessary resources are available. If management actions become inappropriate or necessary resources are not available, a new appropriate management strategy will be implemented.

A review and update of the 1995 Federal wildland fire management policy issued in January 2001 states, "Firefighter and public safety is the first priority [of fire management activities]....Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be based on the values to be protected, human health and safety, and the costs of protection (pp. 22-23)."

FIRE MANAGEMENT OBJECTIVES

The Department of the Interior manual lists the following wildland fire management objectives (620 DM 1):

A. Provide for firefighter and public safety in every fire management activity.

B. Make full use of wildland fire and prescribed fire both as a natural process and as a tool and incorporates the role of wildland fire as an essential ecological process and natural change agent into the planning process. Fire may also be used as a tool to maintain and restore cultural landscapes or to dispose of vegetation and debris.

C. Develop fire management plans, programs, and activities which are based on the best available science; that incorporate public health and environmental quality considerations; and support bureau land, natural, and cultural resource management goals and objectives.

D. Ensure economically viable fire management programs and activities are based on values to be protected; cost effectiveness; risk management; and land, natural, and cultural resource management objectives.

E. Initiate and maintain full international, Federal, Tribal, State, and local interagency coordination, with the involvement of all parties, to insure cooperation, and collaboration.

F. Standardize policies and procedures among Federal agencies and Tribes.

G. In cooperation with other wildland fire management agencies, develop and implement prevention strategies at the local, regional and national levels.

The Service manual (621 FWS 1) makes the following additions to these Departmental policies. The Service will use only trained and certifiably qualified personnel to participate in the fire management program. The Service will integrate fire, as an ecological process, into resource management plans, based upon the best available science. The service will employ prescribed fire for managing resources and protecting against unwanted wildland fire whenever it threatens human life, property, and both natural and cultural resources. Once people are committed to an incident, the human resources become the highest value to receive protection. When the need arises to prioritize between property and natural/cultural resources, the Service will base the decision on relative protection values, commensurate with the fire management costs. The Service will provide safe, cost-effective fire management programs in support of land, natural and cultural resource management plans.

The National Monument is in the process of developing a Comprehensive Conservation Plan (CCP). The CCP will include the following fire management objectives.

- Ensure firefighter and public safety is the first priority in every fire management activity by adhering to the practice of having Lookouts, maintain Communication, having Escape routes and knowing where Safety Zones exist.
- Minimize damage and destruction of the biological, cultural, and historic resources by minimizing reage burned.
- Protect property and improvements from the effects of unwanted fire by reducing fuel loadings and maintain fire breaks along boundaries.

- Reduce the extent of human-caused fires by maintaining fire breaks and implementing fire restrictions when necessary.
- Suppress wildland fires at a cost commensurate with resource values at risk.
- Minimize the reduction of critical shrub-steppe habitat and the potential to damage cultural sites by minimizing acreage burned.
- Use prescribed fire to enhance wildlife and plant species populations, reduce hazardous fuels, eliminate exotic or alien species, promote biological diversity, preserve endangered species, and dispose vegetative waste and debris.
- Manage fire to minimize impact on Threatened and Endangered Species by identifying their location and ensuring that incident objectives include protecting those locations.
- Minimize impact on landscape by doing initial attack with aircraft using water and retardant and/or engines using water, foam and handtools for containment and by restricting the use of ground breaking equipment such as dozers and graders without Project Leader approval.
- Extinguish fires using Minimum Impact Suppression Techniques that rely on handtools, water and time rather than driving around the perimeter to apply water from engines.
- Maintain government to government relationships with the Collville Tribe, the Confederated Tribes of the Umatilla Indian Reservation, the Nez Perce Tribe, the Yakima Indian Nation and the Wanapum Band by providing timely and accurate information on both wildland and prescribed fire activities.
- Prevent wildland fires by developing a Fire Prevention Program to educate the public of fire hazards, to engineer solutions to wildfire risks, and to enforce fire control regulations.

DESCRIPTION OF MONUMENT

GENERAL DESCRIPTION

The Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge includes approximately 195,000 acres sprawling across four counties of south central Washington. The land forms a large C-shaped region, bisected by the Hanford Reach of the Columbia River. All of the land is owned by the Department of Energy and is part of the 360,000 acre Hanford Site. The Hanford Site was established by the US Government in 1943 as a national security area for the production of weapons-grade plutonium and purification facilities. For more than 40 years, the primary mission at Hanford was associated with the production of nuclear materials for national defense. However, large tracts of land were used as protective buffer zones for safety and security purposes and remained undisturbed. These buffer zones preserved a biological and cultural resource setting unique in the Columbia Basin region.

The 195,000-acre Hanford Reach National Monument was established by Presidential Proclamation in June, 2000, to protect the nation's only remaining free-flowing stretch of the Columbia River and the largest remnant of the shrub-steppe ecosystem once blanketing the Columbia River Basin. The U.S. Fish and Wildlife Service and the Department of Energy are joint stewards of the monument. The Proclamation directs the DOE and FWS to protect and conserve the area's native plant communities, specifically recognizing the nationally significant scientific values provided by the area's biologically diverse shrub-steppe ecosystem.

The monument/refuge is located within the planning framework of DOE's Hanford Comprehensive Land-Use Plan (CLUP) and Environmental Impact Statement (EIS), 9/99. The CLUP and subsequent DOE/FWS Memorandum of Agreement and Permit establish the project area as an overlay unit of the National Wildlife Refuge System under FWS management. Pending completion of a Comprehensive Conservation Plan, the FWS formally adopted DOE's CLUP and EIS by Record of Decision, 1999.

FWS-administered lands of the Monument are divided up into four major management units.

The Fitzner-Eberhardt Arid Lands Ecology (ALE) Reserve is a 120 square miles (312 square kilometers) tract of land in the southwestern portion of the Hanford Site. It is designated the Rattlesnake Hills Research Natural Area as a result of a federal interagency cooperative agreement (PNL 1993). The ALE Reserve constitutes the single largest tract in the federal Research Natural Area system for Oregon and Washington (Franklin *et al*. 1972, Rickard 1972), and is one of the few remaining large tracts of shrub-steppe vegetation in Washington that retains a predominant pre-European settlement character (PNL 1993). This area is closed to the public and is maintained for biological protection and appropriate scientific purposes.

The Saddle Mountain Unit of the Monument has been managed by the U.S. Fish and Wildlife Service since 1971 under a 30-day revocable use permit with DOE. This unit is a 50 square miles (130 square kilometers) tract of land located north-northwest of the river and generally south and east of state Highway 24. The Bureau of Reclamation's South Columbia Basin Irrigation District maintains an irrigation return canal that created and sustains the Saddle Mountain Lakes. This area has been closed to public access since the 1940's through permit restrictions for human health and safety. Currently, access is available to approved research activities and any appropriate special uses through the FWS monument headquarters.

The Wahluke Unit of the Monument is a 87 square miles (225 square kilometers) tract of land located north and east of both the Columbia River and the Saddle Mountain NWR. It is bisected by Highway 24. The Bureau of Reclamation's South Columbia Basin Irrigation District maintains several irrigation canals throughout the area. The WB-10 ponds was created and is sustained from irrigation runoff. The Wahluke Unit is open to the public year-round for day use only.

The Columbia River Islands Unit of the Monument is a group of islands within the Columbia River. Seven islands total 320 acres (829 square kilometers). The islands are seasonally open for limited public use.

PHYSICAL RESOURCES

Climate

The Monument is located within the driest and hottest portion of the Columbia Basin. An almost 50 year record of climate data is available for the central portion of Hanford (Hoitink and Burk 1994). Average weather conditions described here are based on that location and are taken from Cushing (1995). Still, it is important to remember that differences in the topography of the Hanford Site contribute to ecologically significant changes in some aspects of climate, particularly annual mean temperature and precipitation (Cushing 1995). For example, although the average annual precipitation for central portion of Hanford is 6.3 in (16 cm), on the crest of Rattlesnake Mountain annual precipitation can reach up to 13.8 in (35 cm) (Downs et al. 1993). Most precipitation occurs during the winter, with more than half the amount occurring from November through February. Snowfall accounts for about 38% of all precipitation from December through February. Average monthly temperatures range from a low of 30ºF (-0.9 ºC) in January to a high of 76ºF (24.6 ºC) in July. Prevailing wind directions are generally from the northwest in all months of the year, but southwesterly winds also regularly occur. Monthly average wind speeds are lowest during the winter months and highest during the summer.

Physiography

The Monument lies in the heart of the Pasco Basin. Columbia River Basalt, a result of lava flows occurring roughly between 17 and 2 million years ago, underlies the Monument. Several basalt ridges traverse the Monument and provide much of its topographic relief. A stretch of the Columbia River (the Hanford Reach) runs through the Monument and forms part of its southern and southwestern boundary. The Columbia River Plain constitutes the majority of the Monument and is both its lowest (about 360 ft [110 m] along the river) and most arid region.

Prominent natural features of the ALE Reserve Unit of the Monument include the ridge top and mostly north-facing slope of Rattlesnake Mountain, portions of the Rattlesnake Hills, Dry Creek Valley, Cold Creek Valley, and the east end of Yakima Ridge. Two streams, Snively Creek and Dry Creek, and a number of cold springs occur within the ALE Reserve (DOE-RL 1996). Elevations across the ALE Reserve range from about 500 ft (150 m) in the Cold Creek Valley to 3450 ft (1050 m) on top of Rattlesnake Mountain.

Prominent natural features within the Saddle Mountain Unit of the Monument include a portion of the Wahluke Slope, the western end of the White Bluffs geologic formation, the slopes and crest of the Saddle Mountains, and a portion of the Hanford Reach of the Columbia River. The refuge contains several lakes and wetlands created and sustained by raised water tables associated with irrigation drainage and runoff.

Prominent natural features found within the Wahluke Unit of the Monument include: a portion of the

Wahluke Slope, the eastern end of the White Bluffs geologic formation, large dune fields above the White Bluffs, the Saddle Mountains (which rise to over 2000 ft [610 m] within the monument/refuge, and several lakes and wetlands created and sustained by raised water tables associated with irrigation drainage and runoff.

FUELS

The fuel types in the shrub-steppe region is typically grass and shrub. The fuel is generally herbaceous plants that are dormant, or are nearly dormant. Occasionally, litter and dead-down stemwood from the open shrub overstory contributes to the fire intensity. Fires in this fuel type are surface fires that move rapidly through the cured grass and associated material. In rare instances, brush can become the primary carrier of fire spread; however, brush requires moderate winds, greater than 8 mph at the mid-flame height, for fire to spread from crown to crown.

FIRE ECOLOGY

Most fires in the area occur during the summer months with the majority of ignitions in June, July, August, and September. Although precipitation free months are rare, these months are generally hot and dry. There are an average of 65 days of 90 º F or above during the summer, and the average precipitation during these months is only 0.3 inches per month.

While fire has played an integral role in the history of the shrub-steppe environment, the region's historical fire regime has been greatly altered from socio-political and economic factors. Couple with the arrival of invasive species and noxious weeds, this has weakened the natural recovery processes of the shrub steppe ecosystem from disturbance events such as fire. The Fire Effects Information Service describes the autecology of the major species in the shrub-steppe. Sagebrush does not tolerate fire, while the grasses are fire-tolerant. Because the grasses offer the availability to carry a fire and because the native grasses are either short in height (Sandberg's bluegrass) or clumpy (bluebunch wheatgrass), the pre-settlement fires were probably small. Thus, the fire regime for the pre-settlement era was probably small, high intensity fires with a long fire return interval (32-70 years). Sagebrush is a fire intolerant species, and totaled only 15-25% of the vegetative cover in sagebrush shrub-steppe communities. Small, infrequent fires maintained bunch grass openings within the shrub-steppe, providing for both shrub and grassland communities.

After the 1900's, human activities interrupted the natural fire interval and patterns of burning. Agricultural development and livestock grazing reduced the light fuels that would normally carry a fire. Livestock grazing also had the effect of suppressing native bunch grasses and allowing sagebrush densities to increase. Beginning about 1906 through the present, fire suppression efforts have resulted in increased sagebrush stand density. This allows for hotter, more destructive fires, due to the closer proximity of each individual plant, which allows fires to spread within the shrub canopy.

Rangeland improvements also brought in a variety of non-native grasses, either as purposeful introductions to provide forage enhancement, or as accidental introductions within seed/pasture mixes. Plants such as cheat grass, tumbleweed, and other annual plants altered native plant community structure. The discontinuous fuel that native bunch grasses provided were invaded by thick, continuous fuels that would carry fires over large areas. Cheatgrass also cures into dry fuel earlier in the fire season than native grasses providing a longer fire season. High mortality of perennial grasses may occur if fire burns in cured litter of annual grasses while perennials are still actively growing. The invasion of cheatgrass has changed the community appearance and altered the fire regime because of an abundance of available and continuous fuel. Natural succession has been altered by cheatgrass such that burned areas do not recover

to their former community structure following fire.

The fire frequency has increased due to an increase in human caused ignitions, and the fire size has increased due to changes in fuel structure. The contemporary fire regime is large, high intensity fires with a shorter fire return interval. This has led to a decrease in the fire intolerant sagebrush and a commensurate increase in exotic species, primarily cheatgrass and tumbleweed.

Four different fuel types are currently recognized in the monument/refuge.

I. Native grasslands are characterized by dry, open, grassy areas, with individual grass clumps providing a discontinuous natural fuels. Native, perennial grasses and forbs are found throughout this community. Perennial grasses and forbs tend to have long, fibrous root structures that can access moisture throughout the soil profile. Thus, native vegetation in this area remains green during the first half of the fire season, curing out during the late summer, July, and August. Fires during late summer can burn within these areas. Perennial grasses may suffer high mortality if fires fueled by cured annual grasses burn perennial species during their active growing season. Fires during late summer can burn within perennial grassland areas. Occasionally, depending upon wind conditions, surface fires can move rapidly through the cured grass and associated materials.

II. Shrub-steppe areas are grasslands that retain a component of shrub as an overstory. Wyoming big sagebrush is the most common, dominant shrub, but there are also communities of three-tip sagebrush, bitterbrush, black greasewood, spiny hopsage, gray and green rabbit brush. Generally, the shrubs burn with greater intensity than the grasses, and produce longer flame lengths. Sagebrush has volatile, flammable chemicals associated with it's foliage. In some areas, the shrubs can burn with such intensity that they permanently destroy the understory plants and create hydrophobic conditions on the soil surface.

III. Riparian and riverine bottoms are occupied by willow dominated communities. Because of their proximity to water, riparian and riverine habitats tend to have a high density of shrubs and trees, and a greater amount of vertical structure. Native and non-native grasses are found in the understory throughout the community. Vegetation in this area remains green during the majority of the fire season, but as the grasses cure the understory becomes more flammable. Dried grasses, and shrubs can provide ladder fuels that burn into the riparian tree canopy and can kill overstory trees. Occasionally, aquatic vegetation can build up such that open water habitat becomes limited. These situations may require fire to reduce such build ups.

IV. Non-native plant communities are dominated by invasive species such as cheatgrass, tumbleweed, and other exotic plants. Cheatgrass germinates in late fall and winter, and cures earlier than native grasses, usually by early June. As the cheatgrass cures it becomes an available abundant and available fuel. Often fires start within the cheatgrass and spread to other adjacent communities. Subsequently, other plants are exposed to burning earlier in the fire season than they historically would have been. This weakens native plants, because they are burned during the peak of their growing cycle, and can allow cheatgrass to spread further into native plant communities. This reduces biodiversity and accelerates the fire cycle.

VEGETATION

The Monument is located within the Columbia Basin Ecoregion (DOE-RL 1996: Appendix C), an area that historically included over 14.8 million acres (6 million ha) of steppe and shrub-steppe vegetation

across most of central and southeastern Washington State (Franklin and Dyrness 1973) as well as portions of north-central Oregon. native, pre-settlement vegetation consisted primarily of shrubs, perennial bunchgrasses, a variety of forbs and a living soil crust composed of lichens, moss and algae. The State of Washington has designated shrub-steppe communities as a priority habitat because of their significance to a number of wildlife species and the scarcity of this habitat type (WDFW 1996). In addition, the U.S. Department of the Interior (DOI) has identified native shrub and grassland steppe in Washington and Oregon as an endangered ecosystem (DOI 1995).

Native Grassland and Shrub-steppe

A number of different plant association zones occur as climatic climaxes (*i.e*., the plant association or community expected to occur in typical sites in the absence of disturbance) throughout the Columbia Basin Ecoregion. The largest and driest of these zones (about 8.2 million acres [3.3 million ha]) is the big sagebrush (*Artemisia tridentata*) / bluebunch wheatgrass (*Pseudoroegneria spicata* [=*Agropyron spicatum*]) association. This association occupies the center of the Columbia Basin Ecoregion, which includes the Hanford Site. In general, the big sagebrush / bluebunch wheatgrass association is characterized by four layers of vegetation: an overstory layer composed mostly of big sagebrush up to two meters tall, a tall understory layer of bluebunch wheatgrass, a short understory dominated by Sandberg's bluegrass (*Poa sandbergii* [included within *Poa secunda*]), and a layer of algae, lichens and mosses on the soil surface (i.e., the microbiotic crust). The microbiotic crust is a critical component of native grasslands and shrub-steppe communities. This diminutive community of mosses, lichens, liverworts, algae, and bacteria stabilizes the soils and fills the interstitial space between bunchgrass clumps. Perennial forbs are a minor constituent of the tall understory layer, whereas most annual forbs occur in the short understory layer. Other shrubs that may be present include rabbitbrush (*Chrysothamnus* spp.), bitterbrush (*Purshia tridentata*), spiny hopsage (*Grayia spinosa*), and three-tip sagebrush (*Artemisia tripartita*). Additional locally abundant bunchgrasses include needle-and-thread (*Stipa comata*), Indian ricegrass (*Oryzopsis hymenoides*), Cusick's bluegrass (*Poa cusickii* [included within *Poa secunda*]) and Idaho fescue (*Festuca idahoensis*). Other associations, such as big sagebrush / Idaho fescue, bluebunch wheatgrass / Sandberg's bluegrass, and bluebunch wheatgrass / Idaho fescue can occur as topographic climaxes on moister sites within the big sagebrush / bluebunch wheatgrass association. Certain edaphic (soil-related) plant associations also are of ecological importance within the ecoregion. On deep soils dominated by gravel, sand, or strongly weathered volcanic ash, needle-and-thread and/or Indian ricegrass replaces bluebunch wheatgrass as the dominant grass in several associations. The dominant shrub in these associations can be either big or three-tip sagebrush or bitterbrush. On stony soils or extremely shallow soils over bedrock (lithosols), various species of buckwheat (*Eriogonum*) and/or stiff sage (*Artemisia rigida*) dominate the shrub layer and Sandberg's bluegrass dominates the understory. As the hottest, driest, and lowest elevation part of the ecoregion, the Hanford Site also possesses a series of three plant associations found on reasonably deep, loamy (but dry) soils. These are the big sagebrush / Sandberg's bluegrass, spiny hopsage / Sandberg's bluegrass, and winterfat (*Atoides* [=*Eurotia*] *lanata*) / Sandberg's bluegrass associations. Each of these associations is characterized by the lack of large, perennial bunchgrasses (Sandberg's bluegrass is relatively small) and low overall plant diversity.

Riparian areas

Riparian vegetation of the Mounument is limited to portions of the Columbia River shoreline, islands and sloughs, a few natural desert springs, and ponds, lakes, and wetlands created by irrigation run off. In a dry, cold-desert environment, riparian areas are extremely valuable. Because of their direct association with water, plant diversity and structure is increased, consequently, the value of these communities as wildlife habitat is very high. Although these areas are small in acreage, riparian zones are a very important component of the Monument. These sites are important because the lush riparian habitat

sharply contrasts with the surrounding dry shrub-steppe and provides trees and larger shrubs not available elsewhere on the Monument. Riparian areas are characterized by diverse shrubs and trees that include a substantial component of, or dominance by willow (S*alix*) species. Other trees include black cottonwood (*Populus trichocarpa*), black locust (*Robinia psuedo-acacia*), and quaking aspen (*P. tremuloides)*. Shrubs include several willow species (*Salix* spp.), mock-orange (*Philadelphus lewsii*), golden currant (*Ribes aureum*), Wood's rose (*Rosa woodsii*), blue elderberry (*Sambucus ceruleus*), chokecherry (*Prunus virginiana*), sumac (*Rhus glabra*), and red-osier dogwood (*Cornus stolonifera*) and western virginbower (*Clematis ligusticifolia)*. Watercress (*Rorripa nasturtium-aquaticum*), stinging nettle (*Urtica dioica*), water speedwell (*Veronica anagallis-aquatica*), rushes (*Juncus* spp.), bulrush (*Scirpus* spp.), and spike rush (*Eleocharis* spp.) are common herbaceous species. The "artificial" wetland areas have a larger component of non-native species such as Russian olive (*Elaeagnus angustfolia*), and tamarisk (*Tamarix parviflora*), but also support native willows (common cattail (*Typhus* sp.) and black cottonwoood.

Disturbed Vegetation/Invasive species

Prior to alteration of the shrub-steppe of eastern Washington in the 1800's, big sagebrush/bluebunch wheatgrass was the dominant vegetation type over much of the Columbia Basin (Daubenmire 1970). Although the Monument area has documented large, relatively undisturbed shrub-steppe plant communities as described above, many previously disturbed areas have altered vegetative communities. One of the primary significant changes to the vegetative communities is the invasion of non-native plant species. Once introduced, these species can proliferate because of the lack of natural predators or because they can out-compete native plant species in disturbed habitats. Moreover, some species are aggressive enough to be successful in invading even intact native plant communities. Disturbed areas of the Monument units usually are dominated by cheatgrass and other exotic species cover with or without big sagebrush. Cheatgrass is a particularly competitive plant that favors disturbed areas, and has several characteristics that enhance its ability to establish and persist, including the ability to germinate in the spring or fall, high seed production, greater germinability than native grasses, and tolerance to grazing. Within several areas the native vegetation has likely been permanently replaced by cheatgrass and other non-native plants, particularly in areas where historic disturbances were the most intense (especially on historically farmed and grazed locations). Vegetation within these areas have highly variable shrub cover, high cover of cheatgrass, frequently a significant cover of Sandberg's bluegrass, and usually a low cover of microbiotic crust. It is unlikely that native bunchgrasses will become established without extensive restoration. Additionally, noxious weeds, and other aggressive non-native plants tend to invade, and become established more readily within previously disturbed habitats. The invasion of non-native plants represents a threat to the integrity of the Monument, and the preservation of it's unique biodiversity.

Rare Plants

A total of 127 populations of 30 rare plant taxa have been documented to occur on the Hanford Site. A majority of these populations and taxa occur on the Monument. In addition, 3 taxa (two species and one variety) had not previously been described and are considered "new" to science; *Eriogonum codium* (Umtanum Ridge desert buckwheat) - a Federal Candidate Species for Threatened and Endangered listing, *Lesqurella tuplashensis* (White Bluffs bladder-pod), and *Astragalus comjunctus* var. *rickardii.* (Rattlesnake mountain milk-vetch). Many of these populations of plants are endemic to the area, several were not previously known from Washington State, or otherwise of botanical interest and potentially of conservation and management concern. Little is known about the ecology, requirements or population dynamics of these species. Fire may be one of the greatest threats to many of these plants, mortality of Umtanum Ridge desert buckwheat was documented following a 1997 fire. There are currently no federally listed plants on the monument/refuge.

FISH AND WILDLIFE

The diversity of habitats across the Monument support a diverse assemblage of wildlife species. The shrub-steppe ecosystem supports an unusually high diversity of native plant and animal species, including significant breeding populations of nearly all steppe and shrub-steppe dependent wildlife. Mature sagebrush/bunch grass and riparian areas are of particular importance for wildlife. The sagebrush is either a food source or provides nesting, resting, thermal and escape cover for a wide variety of species. Other value for wildlife includes the thick canopy which protects under story vegetation (forbs) that can be a valuable food source for wildlife. Riparian areas provide structure and diversity critical for nesting, resting thermal and escape cover, as well as abundant water. Numerous wildlife species depend upon the Monument's intact ecosystems; 43 species of fish, including threatened and endangered salmon and trout; 40 mammals; 246 birds; 4 amphibians; 11 reptiles and over 1500 invertebrates have been documented on the Monument.

Fish

The monument/refuge includes the Hanford Reach; the nation's last, non-tidal, free-flowing segment of the Columbia River. Forty three species of fish have been documented as occurring in the Hanford Reach. Salmonids are of particular interest, large numbers of fall chinook salmon *(Onchorynchus tshawytscha*) spawn in the Hanford Reach, Upper Columbia River Spring Chinook (*Onchorynchus tshawytscha*), listed as a federally threatened species, also uses the Hanford Reach for migration, as well as both the Middle Columbia River Steelhead (*Onchorynchus mykiss*) and Upper Columbia River Steelhead (*Onchorynchus mykiss*) both of which are federally threatened species. Beach seine catches from April-June in the Hanford Reach are dominated by subyearling fall chinook salmon (USGS, unpublished data). Other numerically important species during this time are redside shiners, carp, largescale suckers, northern pikeminnow, and peamouth. Mountain whitefish are common in the Hanford Reach and support a recreational fishery. Centrarchids and percids are more common in McNary Reservoir, although smallmouth bass are also abundant in the Hanford Reach. Tench, threespine sticklebacks, and mountain whitefish are rarely captured in Hanford beach seining activities (Ward, 2001). The ponds and lakes created by irrigation run-off also have populations of introduced fishes such as carp, bass, sunfish, and panfish. Riparian vegetation and backwater sloughs are very important for fisheries habitat. Shoreline vegetation provides shade, moderates temperatures in shallow water and provides shelter and substrate for invertebrate populations all of which are critical for sustaining fish populations. Occasionally, vegetation may become dense and limit open water habitat.

Wildlife

Shrub-steppe obligates/Species of Management Concern

The Proclamation establishing the monument directs the FWS to manage the monument to protect all of the species associated with the shrub-steppe ecosystem. A primary objective of the FWS is to ensure that the area is operated and managed for the protection and preservation of the native shrub-steppe habitat and its associated wildlife species. Wildlife species that are dependent on sagebrush and are considered shrub-steppe obligates in the Columbia Basin Ecoregion include: Ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), sage sparrow (*Amphispiza belli*), Brewer's sparrow (*Spizella breweri*), sage thrasher (*Oreoscoptes montanus*), greater sage grouse (*Centrocercus urophasianus*), long-billed curlew (*Numenius americanus*), sagebrush vole (*Lagurus curtatus*), Merriam's shrew (*Sorex merriami*), pygmy rabbit (*Brachylagus idahoensis*), Washington ground squirrel (*Spermophilus washingtoni*), black tailed jack-rabbit (*Lepus californicus*), sagebrush lizard (*Sceloporus graciosus*) and striped whipsnake (*Masticophis taeniatus*). Management to maintain and enhance habitat for these species is and will be a priority throughout the monument/refuge. Little is known about the habitat needs of many of these species, so that protection and preservation of intact areas

is paramount.

Mammals

The most abundant mammal of shrub-steppe habitat of the Monument is the Great Basin pocket mouse (*Perognathus parvus*). The deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), northern grasshopper mouse (*Onychomys leucogaster*), bushytail woodrat (*Neotoma cinerea*), and northern pocket gopher (*Thomomys talpoides*) are other common small mammals using habitats on the ALE Reserve. Least chipmunks (*Eutamius minimus*) are found in the upper elevations of Rattlesnake Mountain, and sagebrush voles are relatively common above 1,000 feet (305 m) elevation in sagebrush habitat.

Porcupines (*Erethizon dorsatum*) are typically restricted to riparian areas where they feed on the bark of small limbs and tree branches. Black-tailed jackrabbits (*Lepus californicus*) are usually common in mature sagebrush habitat. White-tailed jackrabbits *(L. townsendi*) occur in sagebrush/bunchgrass habitats, generally at higher elevations than black-tailed jackrabbits. The populations of both species are cyclical and are currently at low levels throughout the Columbia Basin.

Large mammals found on the ALE Reserve include the occasional cougar *(Felis concolor*), bobcat (*Felis rufus*), and badger (*Taxidea taxus*). These species are present throughout the Hanford Site in low numbers. A resident Elk (*Cervus elaphus*) herd uses the ALE site portion of the National Monument. Mule deer (*Odocoileus hemionus*) densities on the ALE Reserve and along the Columbia River are the highest among Hanford habitats. Coyotes (*Canis latrans*) are the most abundant large carnivore on the Monument.

The lack of sufficient roost habitat probably limits the density and diversity of bats on the Monument. Bats may be more common in areas adjacent to the Columbia River and in riparian zones around desert springs and lakes created by irrigation return. Studies in the general Hanford vicinity have documented the presence of pallid bat (*Antrozous pallidus*), silver-haired bat (*Lasionycteris noctivangans*), and western small-footed myotis (*Myotis ciliolabrum*). The extent to which these species use the Monument is not known.

Birds

Approximately 238 species of birds have been documented on or near the Monument, 36 of which are common and 40 are accidental visitors. The Monument provides habitat for year-round residents, migratory species that breed on the site, winter residents, and migrants that are passing through to or from breeding grounds.

Mature sagebrush stands are perhaps the most important habitat on the National Monument because large blocks of sagebrush in good condition are a dwindling resource in the Columbia Basin Ecoregion. Horned lark (*Eremophila alpestris*) and meadowlark (*Sturnella neglecta*) are the most abundant breeding birds in the sagebrush/bunchgrass habitats. Brewer's sparrow is more common in the three-tip sagebrush communities at higher elevations. The Brewer's sparrow and sage sparrow are sagebrush obligates and require sagebrush stands for nesting. Other species closely tied to sagebrush occurrence include loggerhead shrike and sage thrashers. Loggerhead shrikes are commonly observed in dense sagebrush stands of the Monument.

The large expanses of bunchgrass habitat on the Monument provide feeding, nesting, and resting areas a

number of bird species. Native bunchgrass habitat is used for foraging by a variety of raptors including Swainson's hawk (*Buteo swainsoni*), golden eagles (*Aquila chrysaetos*), prairie falcons (*Falco mexicanus*), short-eared owls (*Asio flammeus*), and red-tailed hawks (*Buteo jamaicensis*), among others. Meadowlarks, horned lark, and grasshopper sparrow (*Ammodramus savannarum*) are some of the ground-nesting birds that are commonly found in bunchgrass habitat on the ALE Reserve. Burrowing owls (*Athene cunicularia*) and Swainson's hawks also have been documented nesting and feeding in bunchgrass habitat.

Riparian habitat is a scarce but important resource for birds on the National Monument. The sharp contrast with the adjacent shrub-steppe habitat, the presence of trees, and the abundant cover make these areas focal points for predator and prey. Although the total area occupied by riparian habitat is small, the avian diversity is higher than the surrounding shrub-steppe. Riparian habitats are used by neotropical migrants such as, the western wood pewee (*Contopus sordidulus*), Say's phoebe (*Sayornis saya*), western kingbird (*Tyrannus verticalis*), and resident downy woodpeckers (*Picoides pubescens*), and northern flickers (*Colaptes auratus*). Trees are rare on the Monument landscape and therefore provide an important resource for a number of birds. Raptors will perch, hunt from, or nest in trees in the riparian zone, or they may be attracted by the presence of prey species. The barn owl (*Tyto alba*), long-eared owl (*Asio otus*), great-horned owl (*Bubo virginianus*), red-tailed hawk, sharp-shinned hawk (*Accipiter striatus*), American kestrel (*Falco sparverius*), and Swainson's hawk regularly use riparian zones. Chuckar (*Alectoris chukar*), California quail (*Callipepla californica*), and mourning dove (*Zenaida macroura*) find abundant cover from predators in the riparian zones. Red-winged (*Ageliaus phoeniceus*) and Yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) breed along watercourses. Songbirds documented using the Monument riparian zones include the ruby-crowned kinglet (*Regulus calendula*) and golden-crowned kinglet (*R. satrapa*), warbling vireo (*Vireo gilvus*), orange-crowned warbler (*Vermivora celata*), yellow-rumped warbler (*Dendroica coronata*), MacGillivray's warbler (*Oporornis tolmiei*), and Wilson's warbler (*Wilsonia pusilla*), among others. In the winter, riparian zones are used by dark-eyed junco (*Junco hyemalis*), white-crowned sparrow (*Zonotrichia leucophrys*), American robin (*Turdus migratorius*), Townsend's solitaire (*Myadestes townsendi*), and other species (LaFramboise and LaFramboise 1998).

Riverine habitat along the the Hanford Reach is used extensively by Mallards (*Anas platyrhynchos*), Canada geese (*Branta canadensis*) and other waterfowl for wintering, and the island habitats for nesting. Great Blue herons (*Ardea herodias*), Great Egrets (*Ardea alba*), Black-crowned night-herons (*Nycticorax nycticorax*), and other water-related birds have also been noted using the river corridor and islands. Double crested cormorants (*Phalacrocorax auritus*), American white pelicans (*Pelecanus erythrorhynchos*), several species of gulls and terns also use these areas.

Amphibians and Reptiles

Limited surveys recently documented a number of common amphibians and reptiles on the Monument. Species recorded on the include the Great Basin spadefoot toad *(Scaphiopus intermontanus*), Woodhouse's toad (*Bufo woodhousei*), Tiger salamander (*Ambystoma tigrinum*), Pacific treefrog (*Hyla regilla*), Painted turtle (*Chrysemys picta*), short-horned lizard (*Phynosoma douglassi*), sagebrush lizard (*Sceloporus graciosus*), side-bloched lizard (*Uta stansburiana*), racer (*Coluber constrictor*), gopher snake (*Pituophis melanoleucus*), common garter snake (*Thamnophis sirtalis*), western terristrial garter snake (*Thamnophis elegans*) night snake (*Hypsiglena torquata*), striped whipsnake and western rattlesnake (*Crotalus viridis*). Bullfrog (*Rana catesbeiana*), an introduced exotic species, were also documented on the Monument.

Invertebrates

The diversity of insect life on the Monument is very high; over 1500 species have been documented. Darkling beetles (family *Tenebrionidae*) are some of the more conspicuous ground-dwelling insects on the Hanford Site, including the Monument. These beetles play an important role in the nutrient cycling in shrub-steppe communities and are prey for a variety of mammals. Darkling beetles are generally more abundant in warmer and drier locations and in areas dominated by native vegetation, and thus may be a good indicator of change in shrub-steppe habitats.

The ALE Reserve is particularly rich in butterflies and moths; 46 butterfly species and 107 moth taxa have been identified. Umtanum Ridge, Rattlesnake Ridge, and the shorelines of the Columbia River appear to support a wide variety of butterflies, including several rare species. An alkaline spring on Umtanum Ridge supports an endemic snail not known from any other location. Most insects are associated with specific microhabitats or host plants, are short-lived, and travel only short distances during their life. Unlike birds and mammals that may colonize an area if suitable habitat develops, the ability of insects to re-invade sites is minimal. Preservation of the variety of habitats available throughout the Monument is therefore particularly important for invertebrate conservation.

AIR QUALITY

The monument/refuge is located within a Class II air quality area as specified by the Clean Air Act. Air quality in the monument/refuge is well within federal and state standards for criteria pollutants, except that short-term particulate concentrations occasionally exceed the 24-hour standard for particulate matter. Dust storms can create serious visibility problems on highways and other roads within the monument/refuge. Winds capable of moving sand-sized particles occur approximately 40 days per year. An average of eight dust storms a year that decrease visibility to below 10 km (6.2 mi) occur at the Hanford Meteorology Station (U.S. Department of Energy, 1998). Dust storms occur most frequently from March through May and also in September. Wind-blown dust, or "rural fugitive dust" is generally exempt from U.S. Environmental Protection Agency (EPA) regulations.

Outdoor burning permits are issued by the Washington State Department of Ecology in Franklin and Grant counties, and by the Benton Clean Air Authority in Benton County.

WATER RESOURCES

Primary natural surface water features within the monument/refuge include the Hanford Reach of the Columbia River and Snively and Rattlesnake springs; two major spring systems with short stream segments located on the ALE. The Snively and Rattlesnake spring systems provide important aquatic and riparian habitats in an otherwise arid landscape. A number of intermittent natural springs and streams originate on the flanks of Rattlesnake and Saddle Mountains.

Several irrigation canals, part of the Bureau of Reclamation's Columbia Basin Irrigation Project, form artificial lakes (Saddle Mountain lakes), ponds (WB-10 ponds) and associated wetland areas in the Saddle Mountain and Wahluke Units.

The Columbia River within the Hanford Site is unique within the post-dam Columbia River system in the United States. As opposed to the rest of the river system which is a series of slack-water reservoirs formed by dams; here, the river runs freely through an approximately 51-mile segment extending from the upper end of McNary Dam Reservoir to Priest Rapids Dam. Although overall flow volume and corresponding water levels are controlled by upstream dams, the Reach itself remains essentially free-

flowing. As such, it contains significant riparian habitat, islands, riffles, gravel bars, oxbow ponds, and backwater sloughs, which are otherwise rare within the Columbia River system (USFWS 1980, NPS 1994). These once common habitats now provide remnant habitat for aquatic organisms, including salmon that were widespread before the remainder of the Columbia River system was converted to reservoir or slack-water habitat. There are no perennial streams originating from the monument/refuge that feed the Columbia River.

SOILS

Located within the Columbia River Plain, the monument/refuge is underlaid with Columbia River Basalt, a result of lava flows occurring roughly between 17 and 2 million years ago. Massive flood events (The Missoula Floods) occurred periodically towards the end of the Pleistocene epoch; until roughly 12,000 years ago.

Soils on the monument/refuge vary from wind-carried sand and sandy loam to silt, with 15 types in all described (Hajek 1966). The silt loam soils tend to be found on the slopes and higher elevation areas, whereas sandier soils are found at the lower elevations of the Columbia River Plain. Large, active dune fields occur on both sides of the river.

Throughout much of the monument/refuge, a living crust covers some or all of the soil between plants (Nash, 1996a.b). The soil crust - referred to as microbiotic, cryptobiotic, or cryptogamic - is composed of algae, fungi, lichens, and mosses. Microbiotic soil crusts are especially well developed in relatively undisturbed areas of the monument/refuge. Although the ecological role of the microbiotic crust is not completely understood, it is thought to play an important role in ecosystem functioning. Microbiotic crusts can stabilize the soil, thus reducing wind and water erosion (Metting 1991; Johansen 1993; Eldridge and Greene 1994). Some crust organisms contribute nitrogen (Harper and Pendleton 1993) and organic carbon (Johansen et al.1993) to the soil. Some researchers have found an increase in the infiltration of precipitation into the soil with microbiotic soil crusts (Brotherson and Rushforth, 1983). Intact crusts can also enhance native seedling establishment in arid ecosystems (St. Clair et al. 1984), and may discourage invasion by non-native species such as cheatgrass.

Erosion is a major concern on the monument/refuge where disturbance has occurred along roadbeds, powerline corridors, and severely burned areas. High-intensity fires that remove the shrub, herbaceous and microbiotic crust cover from the soil can experience substantial soil loss through wind erosion and spring melt events.

CULTURAL RESOURCES

The monument contains extensive, well-preserved archaeological deposits left by more than 10,000 years of human activity. This area retains traditional cultural significance to members of the Yakama, Umatilla, Nez Perce, and Colville Tribes, and the Wanapum People. Their ancestors resided on the land and used its resources; their past and present culture is tied closely with the landscape. Numerous archaeological sites have been recorded within the monument, with documentation secured at the Pacific Northwest National Laboratory and FWS monument headquarters.

Euro-Americans first visited the region with the Lewis and Clark expedition, followed by fur trappers, military units, miners, and settlers. By 1880, cattle ranches and farms were established on lands currently within the monument/refuge. The federal government acquired 1,517 square km (586 square miles) for the Hanford Engineer Works in 1943, evacuating all citizens and razing most structures. Still, historic

sites have been documented throughout the monument, including the White Bluffs log cabin and ferry landing, natural gas exploration wells, mine tailings, remnants of homesteads and agricultural structures, and historic trash scatters. More recent historic sites on the monument include structures and facilities associated with Cold War activities.

STRUCTURES AND FACILITIES

A complete list of the structures at the Monument can be found in the FIREBASE database. The prominent areas with structures are the Nike missile site, the Rattlesnake Springs facility, and the White Bluffs ferry landing. Monument headquarters and related facilities are located off of the monument property.

RECREATION RESOURCES

Located with one-half day's drive of more than four million people, the monument/refuge provides locally and regionally significant semi-primitive opportunities for fishing, hunting, wildlife observation, photography, environmental education, and motorized and non-motorized boating. Visitors may access over 57,000 acres located on the Wahluke Unit, and over 50 miles of river along the free-flowing Hanford Reach of the Columbia River. The scenery, wildlife, and seasonal opportunities for solitude contribute to the high quality of the experience in this area. Current visitor facilities consist of access roads, parking areas and primitive boat launches in the Wahluke Unit.

Anglers from throughout the Pacific Northwest visit the Hanford Reach for the smallmouth bass, sturgeon, steelhead, and fall chinook salmon sport fisheries. The largest remaining wild fall chinook salmon spawning area in the Pacific Northwest; an internationally significant resource; is found within the Hanford Reach. The heaviest recreation use period on the monument/refuge occurs in September and October during the fall chinook runs.

The Hanford Reach offers excellent opportunities for waterfowl hunting during the fall and winter months. The Wahluke Unit is locally popular for upland bird and deer hunting.

The Hanford Reach and Wahluke Unit offer some of the best opportunities for wildlife observation in eastern Washington State. Bald eagles, common loons, white pelicans, terns, gulls, great blue and night-crowned herons, mule and white tailed deer, coyotes, porcupines and beavers are commonly observed. Outstanding opportunities for birding are available on the Wahluke Unit, especially during spring's influx of migratory song-birds. Showy wildflower displays attract onlookers and botanists each spring.

The Hanford Reach was found suitable for Recreational River designation under the Wild and Scenic Rivers Act (Hanford Reach of the Columbia River Conservation Study and EIS, 1994). This river segment is under interim protection status through Public Law (PL) 100-605, as amended by Section 404 of PL104-333. Interim protection is administered by the FWS.

VISUAL RESOURCES

The landscape setting within the monument/refuge is characterized by broad basins and flat plateaus interspersed with ridges, providing wide, open vistas throughout much of the area. The majority of the area is undeveloped, although the presence of roads and highways, fences, small buildings, power lines, and irrigation canals are visible in much of the area. Outstanding scenic resources include Rattlesnake Mountain, the Saddle Mountain range, the Columbia River, the White Bluffs geologic formation, sand dunes, and the unbroken expanses of shrub-steppe vegetation communities. Shrub-steppe vegetation

communities constitute the region's historic landscape, and the monument/refuge provides excellent examples of the landscape witnessed by post-European explorers Lewis and Clark. Shrub-steppe vegetation communities are characterized by overstories consisting of sagebrush, bitterbrush, black greasewood, spiny hopsage, and rabbit brush, interspersed by perennial bunchgrasses and forbs. Spectacular wildflower displays are evident throughout the area each spring. Portions of the monument/refuge that have incurred surface disturbance are dominated by non-native plant communities such as cheatgrass, knapweed, thistle and skeletonweed. These monotypic plant communities appear markedly different from the historic landscape, and are undesirable from a visual resource perspective.

WILDLAND FIRE MANAGEMENT SITUATION

HISTORIC ROLE OF FIRE

Although natural fire is a factor in this ecosystem, the historic fire regime was a 32 to 70 year fire return interval (Quigley and Arbelbide 1997) of small, high-intensity fires that removed small patches of the fire-intolerant shrub overstory . The bunchgrass component of the native shrub-steppe is a discontinuous fuel bed that prevented many large fires (Paige and Ritter 1999). The introduction of cheatgrass changed this regime by providing a continuous layer of available fuel. Fires that start in cheatgrass stands often spread to surrounding habitats, resulting in the loss of shrubs from adjacent communities. The recovery of sagebrush in these communities may be very slow. Although wind can disperse sagebrush seeds up to 90 feet (30 m), most seeds fall within 3 feet (1 m) of the canopy (Meyer 1994 *in* Paige and Ritter 1999). An increase in fire size results in fire impacting specific locations more frequently. Thus the current fire regime is a short fire return interval of large, high-intensity fires that remove large patches of the fire-intolerant shrub overstory.

Post-settlement Fire History

Organized fire suppression organizations developed in the early twentieth century nationwide. The organized suppression of wildfires probably coincided with the development of the area for agricultural use, which both fragmented the shrub-steppe and reduced fuels through grazing. The presence of extensive stands of fire-intolerant sagebrush stands indicates there has been a long fire free-interval. Similarly, the extensive stands of exotics that invade disturbed areas indicate the size of recent fire perturbations.

Records show that fire season is typically from May to mid-September. Depending on the specific weather of any particular year the seasons may be shorter or longer and, therefore, may start earlier or last longer. Usually, July and August have some dry lightning storms that pose ignition hazards across the Columbia Basin. These predictable events allow increased staffing to respond through the Step-up Plan.

Table 1. Wildfire history since 1991 based on 1202 reports in SACS.

Calendar Year	Wildfires	Acreage burned
1991	2	181.6
1992	5	4032.1
1993	5	12,951.2
1994	3	1042.4
1995	3	2.7
1996	1	5
1997	2	10.1
1998	7	8265
1999	10	1286.8
2000	5	78900.1

Prescribed fire history

To date, the Monument has not used prescribed fire. The Department of Energy used fire for hazard fuel reduction, but the documentation is lacking. Saddle Mountain NWR has used prescribed fire, but the records indicate only two, two-acre burns in the past decade.

RESPONSIBILITIES

The Monument's fire management organization is shown in figure 2.

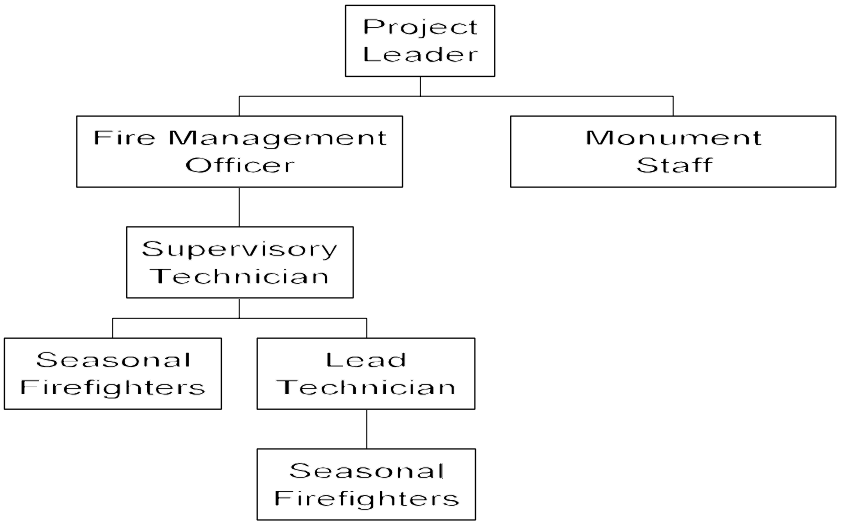


Figure 2. The organization chart for the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge emphasizing the fire management staff.

Project Leader

The Project Leader (PL) is responsible for:

- Planning, budgeting, and implementing an effective wildland fire management program on the Monument.
- Determining the level of fire management effort required to meet wildland fire management objectives for the Monument.
- Making available for dispatch to off-refuge/interagency wildland and prescribed fire management operations all personnel hired in dedicated, fire-funded positions.
- Approving all fire related projects for the Monument.

Fire Management Officer

The Fire Management Officer (FMO) is responsible for

- Planning budgeting, and implementing all fire related projects for the Monument.
- Integrating biological objectives into all fire management planning and implementation projects.
- Soliciting program input from Monument staff.

- Supervising prescribed fire planning.
- Coordinating fire related training.
- Coordinating with cooperators to ensure adequate resources are available for fire operational needs.
- Determining when ecological and political triggers are reached for wildfire and prescribed fire implementation purposes.
- Implementing the Fire Management Plan. This responsibility includes coordination and supervision of all prevention, pre-suppression, detection, wildfire, prescribed fire, suppression, monitoring, and post-fire activities involving Monument lands.
- Preparing fire reports following the suppression of wildfires and for operations undertaken while conducting prescribed fires.
- Preparing an annual report detailing fire occurrences and prescribed fire activities undertaken in each calendar year. This report will serve as a post-year's fire management activities review, as well as provide documentation for development of a comprehensive fire history record for the complex.
- Submiting budget requests and monitors FIREBASE funds allocated to the Monument.
- Maintaining records for all personnel involved in suppression and prescribed fire activities, detailing the individual's qualifications and certifications for such activities. Updates all fire qualifications for entry into the Shared Application Computer System (SACS). Nominates personnel to receive fire-related training as appropriate
- Designating the person to serve as Incident Commander (IC) for initial attack purposes. The FMO may assume the position of IC at his/her discretion or designate other personnel to take over that position at his/her discretion.

The Service Manual states that the FMO is a dedicated, fire-funded position, and is both a Regional and National resource. The FMO may be called upon to assist in both intra-agency and interagency wildland fire management needs.

Supervisory Range Technician

The Supervisory Technician is responsible for

- Planning, coordinating, and directing preparedness activities including fire training, physical fitness testing and Interagency Fire Qualification System (IFQS) data entry, fire cache and equipment inventory accountability, maintenance, and operation, cooperation with cooperative agencies. Insures step-up plan is followed.
- Insuring fire management policies are observed.
- Assisting Prescribed Fire Specialist and Biologist with fire effects monitoring,
- Assist preparing a fire prevention plan, and coordinating fire prevention with other employees.
- Maintaining liaison with Zone Fire Management Officer.
- Assist in updating of the Fire Management Plan,
- Maintaining fire records,
- Reviewing fire reports (DI-1202) for accuracy, and enters fire reports into FMIS.
- Maintaining engines in state of readiness.

Fire Management/Suppression Personnel:

Consists of all Monument personnel, whether permanent or seasonal, who are qualified to be involved in wildland fire activities and who are fully equipped with proper personal protective equipment and gear. As a minimum, their responsibility is:

- Take and pass the minimum classroom training
- Meet physical fitness standards required of NWCG - qualified firefighters.
- Undertake fire management duties as assigned by the Incident Commander on each suppression action or by the Prescribed Fire Burn Boss on each prescribed fire project.
- Maintain assigned fire equipment in ready state and use required PPE.
- Qualify annually with the work capacity test before April 15.

Biologist and Cultural Resource Specialist:
Coordinate through Refuge Managers and Deputy Project Leader to provide subject matter input for the fire program with the FMO to

- Assist in design and implementation of fire effects monitoring with the FMO.
- Participate as requested in prescribed burning and wildfire suppression.

Fire Analysis Committee
The Fire Analysis Committee consisting of the FMO, PL, Deputy PL, and biologist will meet twice annually. The first meeting will occur prior to April 1 and will consider preparation for the upcoming fire season and an analysis of the prescribed fire activities. The preparation for the upcoming fire season will include dispatch plans, fire training needs assessment, and red cards. The second meeting, prior to October 1, will review the fire season, develop Individual Training Plans for fire purposes, and identify prescribed fire projects for the fall and spring season. In addition, the Committee will meet, as needed, to evaluate fire potential, weather and management concerns, to review wildland fires, coordinate actions, develop alternatives, and present them to the PL for approval.

Initial attack teams
Initial attack teams will consist of qualified, currently red-carded personnel in both the ENGB and FFT2 positions (see table 2). If more than one engine resource responds to an incident, a qualified ICT4 must be present. Teams will be prepared and equipped with hand and power tools as needed and will be dispatched with a day's supply of food and water, so they can continue work for 24 hours without additional support.

INTERAGENCY OPERATIONS
The land management agencies in the Department of the Interior signed an interagency agreement with the US Forest Service in 1997, which was amended in 1999. This agreement promotes cooperation and facilitates the exchange of firefighting resources among the Federal agencies. These same agencies signed a Master Cooperative Fire Protection Agreement with the states of Oregon and Washington in 1998. This second agreement facilitates the exchange of firefighting resources between federal and state agencies and establishes a mechanism for developing annual operating plans to fulfill this agreement. A subset of these agencies formed the Eastern Washington Wildfire Coordinating Group. This group used the format suggested in the Master Agreement to establish a local operating plan for lands east of the Cascade crest in Washington. The Monument also uses the Master agreement format to establish cooperative agreements and annual operating plans for cooperating local fire protection agencies. The Monument will develop cooperative agreements and prepare annual operating plans with Benton County District 2, Hanford Fire Department and Grant County District 8 (a sample cooperative agreement is in Appendix D). Contact numbers for these cooperators are listed in the Dispatch plan. On a case-by-case basis, a supplemental agreement for managing the incident can occur when cooperating agencies meet on the incident.

The Monument will use the Incident Command System (ICS) as a guide for fireline organization. Qualifications for individuals follows the 310-1 and is documented in the Shared Application Computer System. Depending on fire complexity, some positions may be filled by the same person.

The monument has proposed that Hanford Fire Department provide initial attack dispatching services. The Department would coordinate with the FMO for managing the incident. The Department would be the ordering for office for fire fighting resources on the dispatch card and for the available resources listed in the dispatch plan. A fire that exceeds the initial attack capabilities would require the completion of a WFSA. Expansion to extended attack would probably require the activation of the Benton County Emergency Operations Center which would fulfill the need for expanded dispatch facilities.

PROTECTION OF SENSITIVE RESOURCES

Sensitive resources are known to exist near Rattlesnake Springs, within 200 yards of the Columbia River, as well as along the ridgetops. Fire Management will protect these sensitive resources by suppressing fires in this area either from exiting roads or the use of flappers and water use. The use of hand tools that break the surface will be avoided when possible. The use of any off-road equipment in these areas requires concurrence by the Project Leader.

At other locations, we would use these same techniques if a suspected sensitive site is encountered. When such a site is identified, the Project Leader should be notified of its location. In no case should the location be announced over the radio.

WILDLAND FIRE ACTIVITIES

Fire program management describes the operational procedures necessary to implement fire management at the Monument. Program management includes: fire prevention, preparedness, emergency preparedness, fire behavior predictions, step-up staffing plan, fire detection, fire suppression, minimum impact suppression, minimum impact rehabilitation, and documentation.

The National Wildfire Coordinating Group (NWCG) has prepared a flowchart for fire management implementation, which includes wildland fire, wildland fire use, and prescribed fire. Because the Monument does not endorse wildland fire use, we use a subset of the NWCG chart. Upon detection of a fire, an appropriate initial response is implemented using the Monument's fire management objectives. If the initial response is unsuccessful, a Wildland Fire Situation Analysis (WFSA) is prepared and an implementation strategy is selected. If the selected is alternative is unsuccessful, a new WFSA is prepared and the process continues until the strategy is successful. All fires not classified as prescribed fires are wildland fires and will be appropriately suppressed (see dispatch cards in the dispatch plan, Appendix E).

Records show that fire season is typically from May to mid-September. Figure 3 shows a trace of burning index derived from Hanford Meteorology Service data. These data show the gradual increase in fire potential that peaks in late July.

FIRE MANAGEMENT STRATEGIES

All unplanned wildland fires will be suppressed in a prompt, safe, aggressive, and cost-effective manner to produce fast, efficient action with minimum damage to resources using appropriate management strategies. The tactics to be used are covered below. Although resource impacts of suppression alternatives must always be considered in selecting a fire management strategy, resource benefits will not be the primary consideration. Appropriate suppression action will be taken to ensure firefighter safety, public safety, and protection of the resources.

The boundaries of the Monument are the most critical areas for fire suppression since we do not want wildland fire to spread onto other's property. With few exceptions, the preferred control point is inside the boundary line. Vehicle access to normally closed areas of the monument will be made using existing fire roads when possible. When off-road travel is determined to be necessary, vehicle access will be allowed with approval of the Monument Project Leader or designee.

Heavy equipment such as crawlers, tractors, dozers, or graders will not be used off existing roads within the monument boundaries unless their use is necessary to prevent a fire from destroying privately-owned and/or government buildings and historic resources. The use of any heavy equipment requires approval from the Monument Project Leader or Designee.

PREPAREDNESS

Preparedness is the process of planning and implementing activities prior to a wildland fire occurrence to carry out the appropriate response. This process includes actions that are completed on a routine basis, as well as incremental actions conducted in response to increasing fire danger. Preparedness activities include: budget planning, equipment acquisition, equipment maintenance, dispatch (Initial attack, extended, and expanded), equipment inventory, personnel qualifications, and training. The preparedness objective is to have a well trained and equipped fire management organization to manage all fire

situations within the monument. Preparedness efforts are to be accomplished in the time frames outside the normal fire season dates.

Historical weather analysis

A weather data set from the central Hanford site (weather station located at 46º 34' North and 119º 36' West) indicates fire danger on the Monument. The program FIREFAMILY PLUS processed this weather data set and generated the Burning Index (BI) graph (fig. 3). These data indicate a general trend of BI, a measure of fire intensity, that gradually increases until reaching a peak in early August, followed by a gradual decrease. A cumulative frequency analysis of BI calculated for April 1-October 30 reveals that a value of 60 represents the 90th percentile. This 90th percentile value is used for planning step-up actions (Appendix C). Most wildland fires that occur when BI is less than 60 should be controllable with station resources.

Records show that fire season is typically from May to mid-September. Figure 3 shows a trace of burning index derived from Hanford Meteorology Service data. These data show the gradual increase in fire potential that peaks in late July.

The USFWS has two Forest Technology Systems fire weather stations at nearby refuges. The Columbia NWR has a weather station west of Othello located at 46º 53' North and 119º 19' West. The Umatilla NWR has a weather station west of Irrigon, OR located at 45º 55' North and 119º 34' West. The Bureau of Land Management has a Remote Automated Weather Station located near Drumheller, WA at 46º and 119º. All of these stations show similar trends in BI, although the actual calculated values vary.

Fire Prevention

An active fire prevention program will be conducted in conjunction with other agencies to protect human life and property, and prevent damage to cultural resources or physical facilities. The monument needs to develop a fire prevention program to address minimizing the acreage burned from human-caused ignitions. Typically this entails identifying the sources of human-caused fire risk and engineering solutions to these risks.

A program of internal and external education regarding potential fire danger will be implemented. Visitor contacts, bulletin board materials, handouts and interpretive programs may be utilized to increase visitor and neighbor awareness of fire hazards. Trained employees need to relate to the public the beneficial effects of prescribed fires as opposed to unwanted human-caused fires, with emphasis on information, essential to understanding the potential severity of human-caused wildland fires and how to prevent them.

It is essential that employees be well informed about fire prevention and the objectives of the monument's fire management program. Further, employees must be kept informed about changes in existing conditions throughout the fire season.

During periods of extreme or prolonged fire danger emergency restrictions regarding monument operations, or area closures may become necessary. Such restrictions, when imposed, will be publicized and posted (see Public Safety Section).

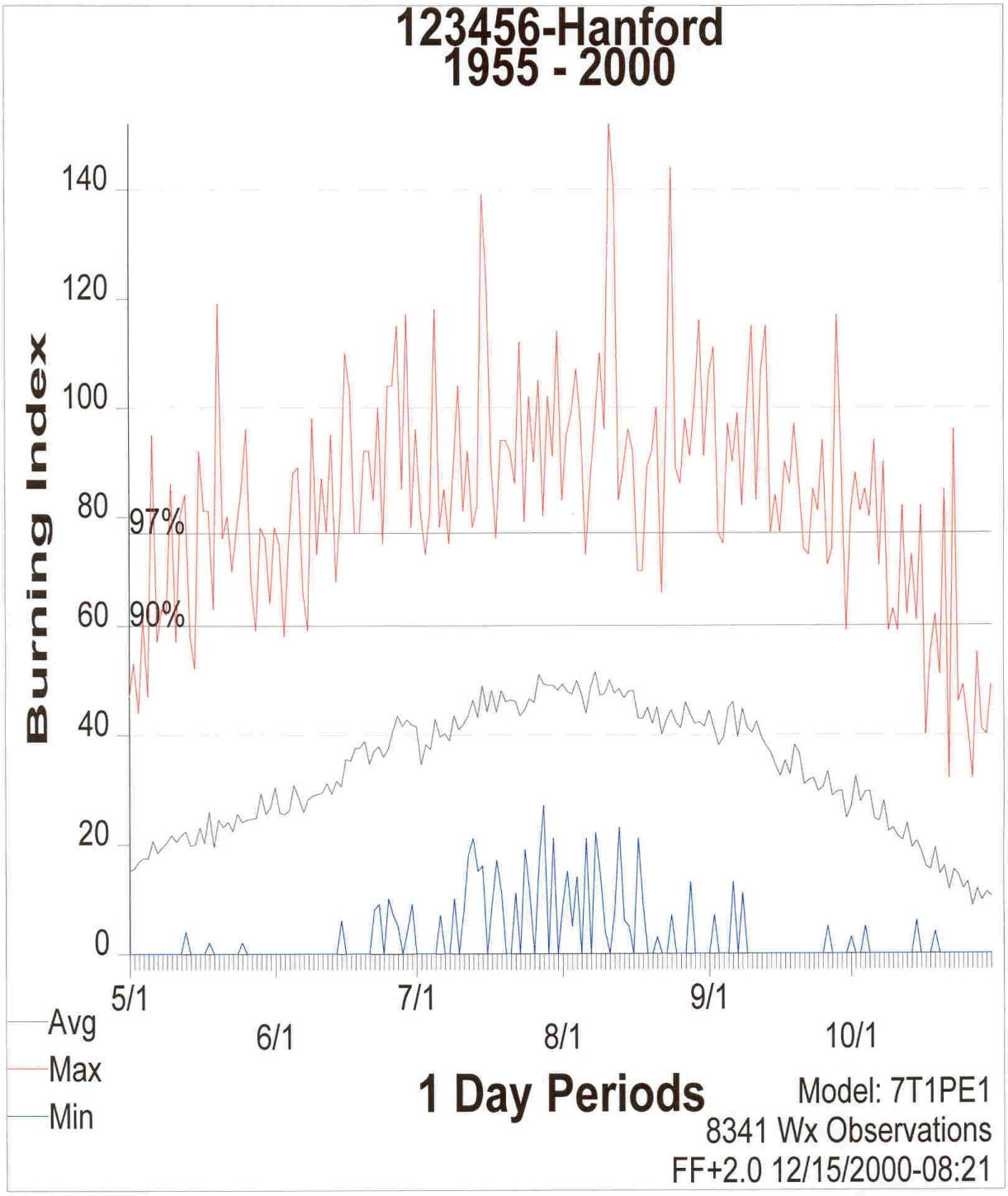


Figure 3. Maximum, average and minimum daily Burning Index Values from 1955 through 2000.

Staffing Priority Levels

The National Fire Danger Rating System (NFDRS) was developed to assess the potential of an initiating fire (Deeming et al. 1977). The rating is based upon average worst-case weather conditions to designate the approximate upper limit of expected fire behavior. A set of twenty NFDRS fuel models provide the parameters for the fire spread model that is central to the NFDRS indices. The Monument uses fuel models A and T (see table 2). Fuel model A represents western grasslands vegetated by annual grasses and forbs. Brush is sparse, occupying less than one-third of the area. Because Deeming et al. (1977) suggests that cheatgrass is an example of model A, we use it for NFDRS for this plan. Although the fuel model is static, Deeming et al. (1977) states that the quantity and continuity of the surface fuels varies greatly with rainfall. Deeming et al. (1977) describes model T as, "the bothersome sagebrush-grass type…The shrubs burn easily and are not dense enough to shade out grass and other herbaceous plants. Shrubs must occupy at least one-third of the site (p. 34)".

Table 2. Fuel bed parameters for the NFDRS fuel models used at the monument (Bradshaw et al. 1988).

Model	Description	Fine Fuel Loading	Medium Fuel Loading	Woody Fuel Loading	Herbaceous Fuel Loading	Fuel Bed Depth
A	Annual Grass	0.2 Tons/acre	None	None	0.3 Tons/acre	0.8 Feet
T	Sagebrush/ Grass	1.0 Tons/acre	0.5 Tons/acre	2.5 Tons/acre	0.5 Tons/acre	1.25 Feet

The Step-up Plan determines the staffing priority. Step-up plans direct incremental preparedness actions in response to increasing fire danger. The plan consists of five staffing classes that describe escalations in preparedness activities. The staffing classes are predetermined responses to increased fire danger for a burning period, which is defined as that period of the day when fire burns most actively in a given fuel type. The burning index (BI), as determined by NFDRS, is the basis to rank fire danger. The BI is designed to reflect the difficulty in controlling a new fire start.

Break points between staffing classes are determined by the cumulative percentages of occurrence of the burning index during the fire season. The most critical break points occur at the 90^{th} and 97^{th} percentiles. These two points define staffing classes 4 and 5. Staffing classes are determined using the following criteria which define the minimum level of the staffing class.

The National Weather Service at Spokane office has a World Wide Web site at http://www.wrh.noaa.gov/spokane/fire.htm. Among the products available on line is the daily fire weather forecasts, available daily at approximately 9 AM and 3:30 PM, and spot weather request forms. They will also respond to written spot weather requests using the Spot weather request form in Appendix H.

During typical wildland fire season (Memorial Day through Labor Day), a series of daily procedures occur. Based upon the Step-up Plan, the minimum staffing class is level 3. Each morning, the fire weather forecast will be obtained from the National Weather Service. A fire behavior prediction will be developed from the forecast. A daily briefing for the fire crews will be developed and will address the following: fire weather summary, fire behavior predictions for rate of spread, flame length and probability

of ignition, fire danger rating indices, local preparedness level, and availability of neighboring resources. These briefing products should be completed and distributed by 10 AM. The staffing class for the remainder of the day is assessed at 2 PM. This assessment occurs through two mechanisms: a FIRE WEATHER PLUS 2000 download of data from the Columbia and Umatilla NWR stations; or using WIMS to display the fire danger indices. The staffing class for the following day is based upon the afternoon weather forecast and the Fire Danger Calculator in FIREFAMILY PLUS. The FMO is responsible for assuring that the fire danger rating is assessed for the day.

The seasonal risk requires a daily tracking of BI and comparing the values to historic average and the daily maximum value. The pocket card (fig. 4) indicates the fire danger characteristics for the Monument.

Training

Departmental and Service policy (232 FW 6, 241 FW 7, and 621 FW 1.6) requires that all personnel engaged in suppression and prescribed fire duties meet the standards set by the National Wildfire Coordinating Group (NWCG) in the 310-1 *Wildland and Prescribed Fire Qualification System Guide*. The 310-1 manual establishes minimum training requirements, experience, and physical fitness standards. All personnel participating in both refuge and interagency fire operations (both wildland and prescribed fire) must meet the 310-1 standards. The Service Manual identifies five objectives for fire management training. The fire management training program will promote safe individual performance, use the fire staff to provide training to both regional and field areas, manage instructor certification, cooperate and coordinate with the interagency community to provide mutual training opportunities, and use other curricula whenever possible. The Monument will conform strictly to the requirements of the wildland fire management qualification and certification system and USFWS guidelines.

The expected overhead positions for the Monument are listed in the following table along with the level of experience and training courses. Table 3 shows fire qualifications based upon the 310-1 manual.

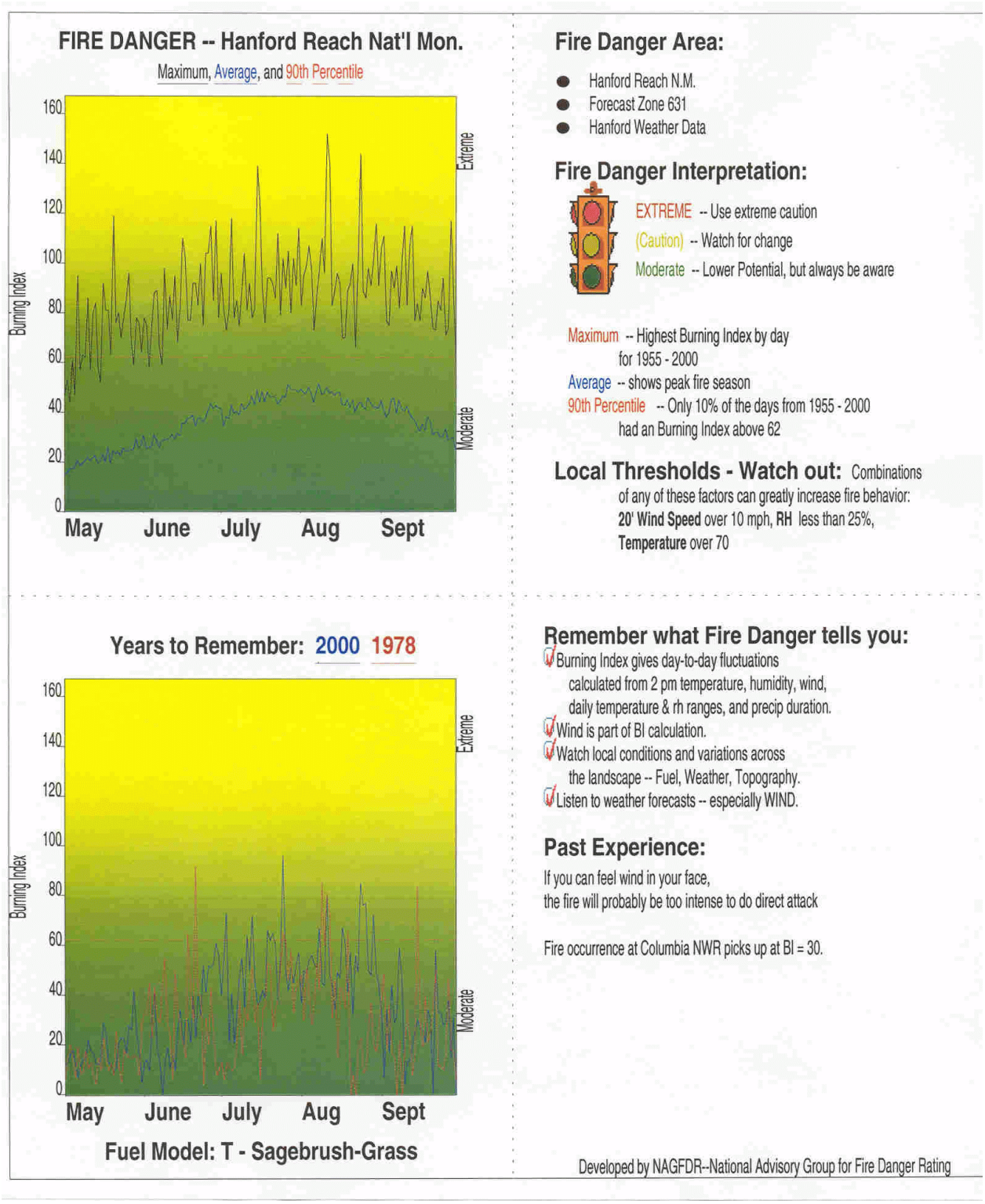


Figure 4. Fire Danger Pocket Card for the Hanford Reach National Monument.

Table 3. Required training and experience for positions based upon the 310-1 Manual.

Mnemonic	Title	Required Experience	Required Training	Recommended Training
FFT2	Firefighter	None	S-130 S-190	I-100
FFT1	Advanced Firefighter	FFT2	S-131	S-201 S-211 S-212
ENGB	Single Resource Boss-Engine	FFT1	S-230 S-231 S-290	S-234 S-260 S-270
ICT4	Incident Commander-Single Resources	ENGB		S-200
STEN	Strike Team Leader	ENGB	S-330 S-390	
TFLD	Task Force Leader	ENGB	S-330 S-390	
ICT3	Incident Commander-Multiple Resources	TFLD or STEN & ICT4		S-300

The Fire Management Officer is responsible for providing routine training. Annual safety refresher training is mandatory for all carded firefighters, as well as Project Leaders. The minimum content of this refresher covers the Ten Standard Fire Orders, the eighteen Situations that Shout, "Watch Out," and fire shelter training. The mechanism for presenting this material is at the discretion of the FMO, but generally rotates among the following training courses: SA-130 Standards for Survival; SA-290 Look up, Look down, Look around; and the Lookouts, Communication, Escape Routes, and Safety Zones Workshops. Ideally, the refresher occurs the first week that the seasonal firefighters report for work.

Additional training is available from other agencies in pump and engine operation, power saws, firefighter safety, fire weather and fire behavior, helicopter safety and prescribed fire objectives and activities. On-the job training is encouraged and will be conducted at the field level. Whenever appropriate, the use of fire qualification task books will be used to document fire experience of trainees. The FMO will coordinate fire training needs with those of other nearby refuges, cooperating agencies, and the RO.

The Monument supports the development of individual Incident Command System (ICS) overhead personnel from among qualified and experienced monument staff for assignment to overhead teams at the local, regional, and national level.

Fire suppression is an arduous duty. Because personnel may be required to shift from implementation or monitoring activities to suppression on prescribed fires, the Monument will use the 310-1 standards for fitness on all fire positions. Poor physical condition of crew members can endanger safety and lives during critical situations.

Personnel performing arduous fire management duties will maintain a high level of physical fitness. This requires successful completion of a fitness pack test. Personnel must annually complete a three mile hike with a 45 pound pack in less than 45 minutes.

Supplies and Equipment

Each engine will be equipped with the minimum items listed in the Fireline Handbook. The Fire Management Handbook lists the Normal Unit Strength criteria for an equipment cache (pg. 3.1-9). This cache is intended to support all refuge initial attack staff. Fires that exceed initial attack should be supported with standard Resource Orders for supplies and charged to a specific incident. Cache maintenance is the responsibility of the Supervisory Technician.

As a new program, the Monument has neither a storage facility nor the material to store in a fire cache. Adjacent programs have these items and the Monument will rely upon their facilities until fully functional with a fire cache facility. The Monument will use the criteria for Normal Unit Strength outlined on page 3.1-9 of the Fire Management Handbook. Items will be issued to personnel using standard property issue forms (DI-104 or equivalent).

DETECTION

Most fires are reported by the general public to the 911 Services branch of the county government. The Emergency Service then notifies the agency with jurisdictional responsibility. In Benton County, notification goes to Hanford Dispatch while in both Adams and Grant Counties, notification goes to Columbia NWR. At Hanford, notification goes to the Supervisory Technician while Columbia NWR would both respond and notify the Supervisory Technician.

The Fire Management Plan does not discriminate between human-caused and lightning caused fire. All wildland fires will be suppressed. However, detection may include a determination of fire cause. Human-caused fires will require an investigation and report by law enforcement personnel. For serious human-caused fires, including those involving loss of life, a qualified arson investigator will be requested.

COMMUNICATIONS

A standard Communication Plan is in the appendix. The Communication Plan has standard channels and frequency pairs for authorized frequencies. The engine boss or incident commander is responsible for communicating with the main office about the status of the incident. A field report form to facilitate the exchange of information is in the dispatch plan.

PRE-ATTACK PLAN

The Pre-attack plan checklist in the Fire Management Handbook covers four of the five functional areas within the Incident Command System (omitting Finance Section). The Command issues are addressed in the WFSA process that includes a delegation of authority. The Operations issues are covered in the dispatch plan (Appendix D). The Logistics issues are to be developed in a Mobilization Guide and Sources of Supply document. Planning issues are addressed in the Fire Management Units (FMU's).

The FMO should convene a pre-season fire planning meeting of interested parties. The parties should include, but not be limited to the Confederated Tribes of the Umatilla Indian Reservation, other tribes, cooperating agencies such as the Hanford Fire Department, adjacent fire protection districts, and Benton County Emergency Services.

The dispatch plan contains the procedures and information necessary for most fire incidents. Typically, most fires are managed during the initial attack phase. However, fires can transition into larger incidents requiring a minimum of three documents: WFSA, Complexity Analysis, and a Delegation of Authority (see figure 5). Each of these topics are addressed in suppression tactics, below.

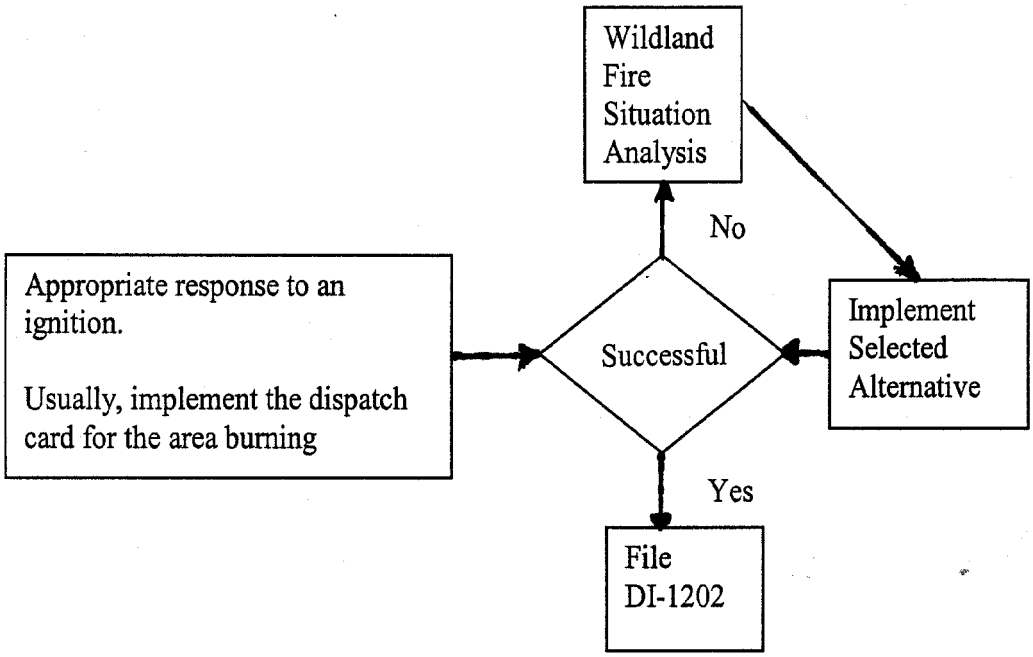


Figure 5. Wildfire response chart modified from FWS Appropriate Response chart in FMH.

FIRE MANAGEMENT UNITS

A Fire Management Unit (FMU) is an area that has common wildland fire management objectives and strategies. An FMU is delineated by natural or man-made fuel breaks and is manageable from a wildland fire standpoint. The FMU's for the Monument are in figure 6.

ALE/ McGee-Riverlands

The ALE/McGee-Riverlands FMU is 86,000 acres in size. The dispatch card for a solitary incident in this unit is as follows (Table 4):

RESOURCE	Staffing class 1	Staffing class 2	Staffing class 3	Staffing class 4	Staffing class 5
Incident Commander	Type 4	Type 4	Type 3	Type 3	Type 3
Engine *	1	2	5	8	8
Water Tender *			2	3	3
Consider requesting an Air Tanker				1	2
Consider requesting a Helicopter				1	2

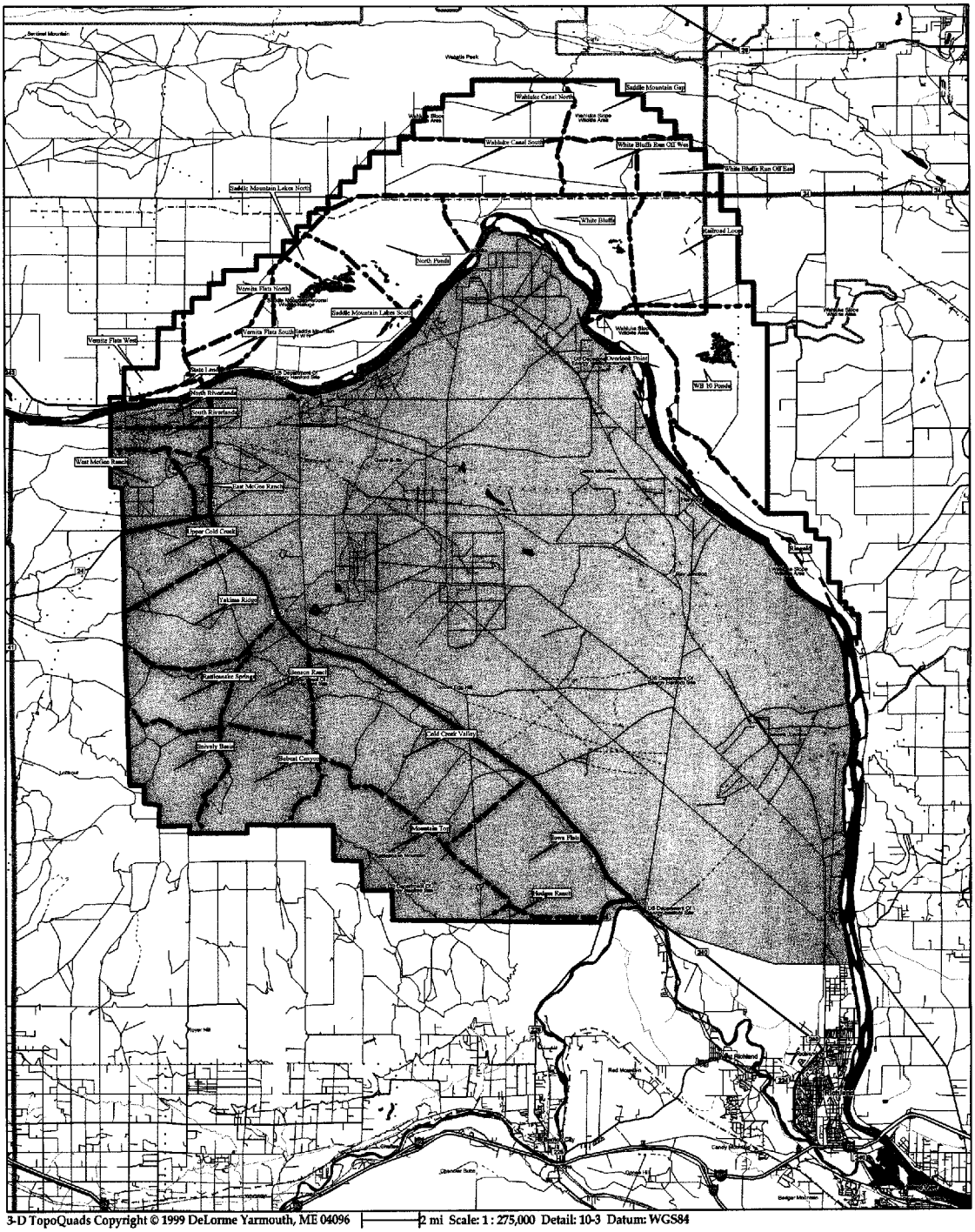
*if available. Use closest resource with a preference to FWS and Hanford resources.

The ALE unit has ten sub-units based on existing roads that would facilitate fire control. Plants that grow near the ridgetop are unique to the site. The Rattlesnake Springs area has cultural values. The use of heavy equipment is restricted in the Rattlesnake Springs area. Except on existing roads, the use of any equipment (including light engines) within 1/4 mile of the escarpment edge of the Umtanum Ridge is prohibited because of surface instability and potential for sloughing at the escarpment. Protection of sensitive resources is an objective unless achieving this objective jeopardizes either firefighter or public safety.

Saddle Mountain

This unit consists of 30,000 acres of the original Saddle Mountain National Wildlife Refuge plus 57,000 acres of the former Wahluke Slope Wildlife Management Area land both north and south of State Road 24 in Adams, Franklin and Grant Counties. The dispatch card for a solitary incident in this unit is as follows (Table 5):

RESOURCE	Staffing class 1	Staffing class 2	Staffing class 3	Staffing class 4	Staffing class 5
Incident Commander	Type 4	Type 4	Type 3	Type 3	Type 3
Type 6 Engine *	1	2	4	6	6
Type 5 Engine *		1	1	2	2
Water Tender *			1	1	2
Consider requesting an Air Tanker				1	2
Consider requesting a Helicopter				1	2



*if available. Use closest resource.

Figure 6. Fire management units and control units.

The vast Saddle Mountain unit, approximately 90,000 acres, has sixteen sub-units demarcated by roads. The parts of this unit that is in Franklin county receives no protection from the rural fire district. Except on existing roads, the use of any equipment (including light engines) within 1/4 mile of the escarpment edge of the White Bluffs is prohibited because of surface instability and potential for sloughing at the escarpment. Activities within 200 yards of the Columbia River banks may encounter archeological artifacts. Except on existing roads, no equipment can be within 200 yards of the Columbia River. Suppression activities within 200 yards of the river are restricted to the use of water and flappers except as directed by the PL. Protection of sensitive resources is an objective unless achieving this objective jeopardizes either firefighter or public safety.

Ringold Unit

This unit is the former Wahluke Slope Wildlife Management Area in Franklin County. This remote area of the Monument is outside the district boundaries of cooperators. Additional support would require a supplemental agreement with Franklin County 4 in Basin City. The dispatch card for a solitary incident in this unit is as follows (Table 6):

RESOURCE	Staffing class 1	Staffing class 2	Staffing class 3	Staffing class 4	Staffing class 5
Incident Commander	Type 4	Type 4	Type 3	Type 3	Type 3
Engine (USFWS)*	1	2	3	4	4
Water Tender *			1	1	2
Consider requesting an Air Tanker				1	2
Consider requesting a Helicopter				1	2

*if available. Use closest resource.

Activities within 200 yards of the Columbia River banks may encounter archeological artifacts. Except on existing roads, no equipment can be within 200 yards of the Columbia River. Suppression activities within 200 yards of the river are restricted to the use of water and flappers except as directed by the PL. The use of any equipment (including light engines) within 1/4 mile of the escarpment edge of the White Bluffs is prohibited because of surface instability and potential for sloughing at the escarpment. Protection of sensitive resources is an objective unless achieving this objective jeopardizes either firefighter or public safety.

Due to staff limitations, relatively large land management parcels, long response times, valuable resources, and values at risk on neighboring lands, this plan does not recommend wildland fire managed for resource benefit as an option for any of the units. Wildland fires will be suppressed using the appropriate suppression response. Prescribed fires will be used to reduce hazardous fuels and to meet resource management objectives.

Fuel Types

The fuel types in the shrub-steppe region is typically grass and shrub. A set of fire behavior fuel models exist and following descriptions are from Anderson (1982). Where grass is the primary carrier of fire spread, we use models 1 and 2 of the three grass fuel models. In the short grass fuel model (1), fire

spread is governed by the fine, porous, and continuous herbaceous fuels that have cured, or are nearly cured. Fires are surface fires that move rapidly through the cured grass and associated material. Very little shrub or timber is present, generally less than one-third of the area. Annual and perennial grasses are typical of this fuel model.

In the sagebrush/grasslands fuel model (2) fire spread is primarily through the fine herbaceous fuels, either curing or dead. These are surface fires where the herbaceous material, in addition to litter and dead-down stemwood from the open shrub overstory contributes to the fire intensity. Open shrub lands that cover one-third to two thirds of the area may generally fit this model.

Rarely, brush becomes the primary carrier of fire spread and fuel model 6 would apply. In this fuel model, fire is carried through the dormant shrub layer, but requires moderate winds, greater than 8 mph at mid-flame height, to spread from crown to crown. This fuel model generates greater rates of spread and longer flame lengths than model 2.

The fuel bed parameters for these models are as follows: (table 7)

Model	**Description**	**Fine Fuel Loading**	**Medium Fuel Loading**	**Heavy Fuel Loading**	**Herbaceous Fuel Loading**	**Fuel Bed Depth**
1	Short Grass	0.74 Tons/acre				1.0 Feet
2	Sagebrush with a Grassy Understory	2.0 Tons/acre	1.0 Tons/acre	0.5 Tons/acre	0.5 Tons/acre	1.0 Feet
6	Dormant Brush	1.5 Tons/acre	2.5 Tons/acre	2.0 Tons/acre		2.5 Feet

Fire Behavior

Expected fire behavior is shown as follows: (table 8)

Parameter	Short Grass-Average	Short Grass-Extreme	Sage Brush-Average	Sage Brush-Extreme
INPUTS				
Fuel Model	1	1	2	2
1-Hour Fuel Moisture Content - (FMC)	7	4	7	4
10 Hour FMC			8	5
100 Hour FMC			9	6
Live FMC			100	50
Mid-Flame Wind Speed (mph)	6	8.9*	6	18
Slope (%)	20	20	20	20
OUTPUTS				
Rate of Spread (chains/hour)	134	345	49	473
Flame Length (feet)	5	9	7	22

* 8.9 mph is the maximum reliable wind speed in short grass (see table 9a and b).

These fire behavior outputs indicate the potential for fire control problems. Even under average burning conditions, fires are too intense to use direct attack methods with hand tools. Under these average conditions the modeled line production rate is 335 AND 102 chains per hour for short grass and sagebrush, respectively, to contain a fire that has burned freely for 30 minutes.

The following tables shows the range of fire behavior for various fine fuel moisture and wind conditions in the three major fuel models. Only fuel model 2 has a live fuel component. We feel that the above table indicates reasonable conditions (i.e., when fine fuels are dry, live fuel moisture should also be low). Generally, lower live fuel moisture results in higher fire behavior characteristics.

Table 9a. Fuel Model 1:Short Grass

Rate of Spread	0 mph (eye level wind speed)	5 mph (eye level wind speed)	10 mph (eye level wind speed)	15 mph (eye level wind speed)
3 % Fine Fuel Moisture	8 Chains/Hour	122 Chains/Hour	*446 Chains/Hour*	*446 Chains/Hour*
6 % Fine Fuel Moisture	6 Chains/Hour	96 Chains/Hour	*270 Chains/Hour*	*270 Chains/Hour*
9 % Fine Fuel Moisture	4 Chains/Hour	71 Chains/Hour	*136 Chains/Hour*	*136 Chains/Hour*

Italics indicate that the maximum reliable windspeed limit was reached where wind is too great for the available fuel to support reliable fire spread. Values shown in italics are the maximum reliable outputs for the wind and fuel moisture conditions.

Table 9b. Fuel Model 1:Short Grass

Flame Length	0 mph (eye level wind speed)	5 mph (eye level wind speed)	10 mph (eye level wind speed)	15 mph (eye level wind speed)
3 % Fine Fuel Moisture	1.5 Feet	5.5 Feet	*10 Feet*	*10 Feet*
6% Fine Fuel Moisture	1.3 Feet	4.6 Feet	*7.5 Feet*	*7.5 Feet*
9% Fine Fuel Moisture	1.0 Feet	3.7 Feet	*5.0 Feet*	*5.0 Feet*

Italics indicate that the maximum reliable windspeed limit was reached where wind is too great for the available fuel to support reliable fire spread. Values shown in italics are the maximum reliable outputs for the wind and fuel moisture conditions.

Table 9c. Fuel Model 2:Litter and understory (sagebrush)

Rate of Spread	0 mph (eye level wind speed)	5 mph (eye level wind speed)	10 mph (eye level wind speed)	15 mph (eye level wind speed)
3% Fine Fuel Moisture	4 Chains/Hour	48 Chains/Hour	162 Chains/Hour	336 Chains/Hour
6% Fine Fuel Moisture	3 Chains/Hour	39 Chains/Hour	132 Chains/Hour	273 Chains/Hour
9 % Fine Fuel Moisture	3 Chains/Hour	34 Chains/Hour	116 Chains/Hour	240 Chains/Hour

Table 9d. Fuel Model 2:Litter and understory (sagebrush)

Flame Length	0 mph (eye level wind speed)	5 mph (eye level wind speed)	10 mph (eye level wind speed)	15 mph (eye level wind speed)
3 % Fine Fuel Moisture	2.4 Feet	7.8 Feet	13.5 Feet	18.9 Feet
6 % Fine Fuel Moisture	2.1 Feet	6.6 Feet	11.6 Feet	16.2 Feet
9% Fine Fuel Moisture	1.9 Feet	6.1 Feet	10.6 Feet	14.9 Feet

Table 9e. Fuel Model 6: Dormant Brush

Rate of Spread	0 mph (eye level wind speed)	5 mph (eye level wind speed)	10 mph (eye level wind speed)	15 mph (eye level wind speed)
3 % Fine Fuel Moisture	4 Chains/Hour	48 Chains/Hour	162 Chains/Hour	336 Chains/Hour
6 % Fine Fuel Moisture	3 Chains/Hour	39 Chains/Hour	132 Chains/Hour	273 Chains/Hour
9 % Fine Fuel Moisture	3 Chains/Hour	34 Chains/Hour	116 Chains/Hour	240 Chains/Hour

Table 9e. Fuel Model 6: Dormant Brush

Flame Length	0 mph (eye level wind speed)	5 mph (eye level wind speed)	10 mph (eye level wind speed)	15 mph (eye level wind speed)
3 % Fine Fuel Moisture	2.4 Feet	7.8 Feet	13.5 Feet	18.9 Feet
6 % Fine Fuel Moisture	2.1 Feet	6.6 Feet	11.6 Feet	16.2 Feet
9 % Fine Fuel Moisture	1.9 Feet	6.1 Feet	10.6 Feet	14.9 Feet

SUPPRESSION TACTICS

Wildland fires will be suppressed in a prompt, safe, aggressive, and cost-effective manner to produce fast, efficient action with minimum damage to resources. Suppression involves a range of possible actions from initial attack to final suppression. All wildland fires will be suppressed.

Personnel and equipment must be efficiently organized to suppress fire effectively and safely. To this end, the FMO assumes the command function on major or multiple fire situations, setting priorities for

the use of available resources and establishing a suppression organization.

There will be only one Incident Commander responsible through the FMO to the Monument PL. The Incident Commander (IC) will designate all overhead positions on fires requiring extended attack. Reference should be made to a Delegation of Authority (Appendix E). The IC is responsible for protecting sensitive resources without jeopardizing either firefighter or public safety. The IC is also responsible for informing the PL of tactics.

The primary tactic to be implemented is direct attack to minimize the acreage burned. Direct attack would use engines and hand tools to contain the fire. The IC must assess the probability of relying on direct attack to contain a fire with available resources. The use of indirect attack from existing roads should be considered early in the incident. Because fire spread can be rapid, successful containment may depend upon how quickly tactics shift to indirect attack.

Minimum Impact Suppression Tactics (MIST) will be applied, where applicable The Fire Management Handbook defines MIST as the aggressive application of those strategies and tactics that effectively meet management objectives with the least cultural and environmental impact. However, at no time should MIST be used if suppression objectives cannot be accomplished. MIST has a significant impact on the mop-up phase of suppression as a fire is managed with time rather than against time. The intent of MIST is to suppress a wildland fire with the least impact to the land. Fire conditions and good judgment dictate the actions taken. Consider what is necessary to halt fire spread and contain it with the fireline or designated perimeter boundary. The MIST implementation guidelines are as follows:

A. Safety
- Safety is of utmost importance.
- Constantly review and apply the Watch Out Situations and Fire Orders.
- Be particularly cautious with:
  - Burning snags allowed to burn.
  - Burning or partially burned live and dead trees
  - Unburned fuel between you and the fire.
  - Identify hazard trees with either observer, flagging and/or glow-sticks.
  - Be constantly aware of surroundings, expected fire behavior, and possible fire perimeter 1 or 2 days hence.

B. Fire Lining Phase
- Select procedures, tools, equipment that least impact the environment.
- Seriously consider using water as a firelining tactic (fireline constructed with nozzle pressure, wetlining).
- In light fuels, consider:
  - Cold-trail line.
  - Allowing fire to burn to natural barrier.
  - Burning-out and use of gunny sack or swatter.
  - Constantly rechecking cold-trailed fireline.
  - If constructed fireline is necessary, using minimum width and depth to check fire spread.
- When using indirect attack:
  - Do not fall snags on the intended unburned side of the constructed fireline, unless they are a safety hazard to crews.

- On the intended burn-out side of the line, fall only those snags that would reach the fireline should they burn and fall over. Consider alternative means to falling, i.e., fireline explosives, bucket drops.
- Review items listed above (aerial fuels; brush, trees, and snags).

C. Mop-Up Phase
- Consider using hot-spot detection devices along perimeter (aerial or hand-held).
- Light fuels:
  - Cold-trail areas adjacent to unburned fuels.
  - Do minimal spading; restrict spading to hot areas near fireline.
  - Use extensive cold-trailing to detect hot areas.

Initial Attack

The following information is duplicated from the dispatch plan (appendix E). Upon receipt of a fire or smoke report, fill out the report of fire occurrence form. If the fire is on FWS land, or is threatening (usually restricted to burning within a mile of the boundary), then dispatch firefighting resources based upon the dispatch card. While the resources are en route to the fire, relay the fire weather forecast, expected fire behavior, adjacent resource availability, and current weather conditions. A radio log or a unit log (ICS 214) should be initiated. As soon as possible, notify both the FMO and the Project Leader, or their designees, about the ignition.

Step 1: Determine an initial attack plan immediately upon arrival at the fire. This should be done quickly and be based on your initial size-up of the fire. The intent is to get work started in suppressing the fire as soon as possible. Determine:

- Locations of escape routes and safety zones.
- Special hazards such as burning snags, power lines, etc.
- Good anchor points such as roads, burned area, etc.
- Where to attack the fire, i.e. at the head, flanks or rear.
- How to attack the fire, i.e., direct or indirect.
- Type of control line needed.
- Are there existing barriers that can be used?
- When will the next units arrive?
- Additional resource needs.
- How will topography affect the fire behavior?
- Locate and preserve the point of origin.

Step 2: Brief the crew and begin work. Make sure crew understands their work assignment. PROMPT DECISIVE ACTION DURING THE EARLY STAGES OF A FIRE OFTEN DETERMINES THE SUCCESS OR FAILURE OF THE INITIAL ATTACK.

When safe, begin the attack at the head of the fire to quickly stop the spread. Remember that Watch Out Situation #10 is, "You are attempting frontal assault on the fire." Establish anchored control lines. Exceptions to attacking the head:

- Fire intensity is such that work at the head of the fire is unsafe.
- Fire is burning toward a natural barrier that will check the spread. A high value resource must be protected along another portion of the fire perimeter.
- The fire is likely to burn into volatile fuels along another area of the fire

perimeter that will result in an increased rate of spread.

Step 3: After resources have been deployed and control action started, continue assessment of the fire, and gather information for determining fire cause. Consider the following:

- Safety - watch for danger areas and evaluate escape routes.
- Size of the fire.
- Length of the fire perimeter.
- Location of the head.
- Values to be protected ahead of the fire.
- Current and expected weather.
- Fire behavior - as expected?
- Fire intensity and rate of spread.
- Fuel type - at location and proximity.
- Topography.
- Time of day.

Step 4: Review the following checklist and take action to correct IMMEDIATELY if the answer to any question is "NO".

- Do you have current fire weather forecast for the fire location?
- Is the observed fire weather consistent with the forecast?
- Can you control the fire with the resources available (on the incident, as well as those en route) under expected conditions?
- Have you developed a plan to attack the fire? (Direct vs. indirect. Anchor points, escape routes, head or flank attack, priority areas).
- Have you communicated the plan to all personnel assigned to the incident, including new arrivals?
- Lookouts in place, or you can see all of the fire area?
- Can you communicate with everyone on the fire and with dispatch?
- Escape routes and safety zones are established. If you are using the black, is it completely burned and without a reburn potential?
- Safety and the standard fire orders are being followed?
- Have you reported the status of the fire to dispatch?
- Will you control the fire before the next operational period?
- Do you have a complete list of what resources have been ordered for the fire?
- If the fire will not be controlled before the next operational period, or the size of the organization exceeds the IC's capability to manage, have you informed agency headquarters?

After the resources arrive at the fire, a field report should be requested. The IA Incident Commander (IC) (IAIC) should follow Chapter 1 of the Fire Line Handbook (FLH), which covers IA with details about duties and responsibilities, checklists, and general descriptions of both strategy and tactic. Many fires at the Monument require a Type 3 Incident commander (IC) during the initial attack phase because of the number of resources responding. After forming an initial response, the IAIC should report progress. Both the IAIC and management should be assessing the possibility that the fire will transition to a higher complexity using the following list:

1. The IAIC requests additional resources.
2. Fire will not be contained by the beginning of the second full operational period.

3. Fire activity has required a change in strategy or tactics.
4. The IAIC request an Extended Attack IC.
5. Or, the project leader wants a more experienced IC.

During the transition period, the IAIC, FMO and PL have a number of responsibilities. The IAIC should do the following tasks:

1. Continue actions including shift planning, resource ordering, and assignment of resources.
2. Prepare the IC briefing.
3. Establish, in conjunction with office personnel, a check-in procedure for incoming resources.

The FMO should complete the following tasks during the transition period:

1. Prepare a complexity analysis.
2. Recommend an IC.
3. Initiate a Wildland Fire Situation Analysis (WFSA) that the PL will complete.
4. Establish an expanded dispatch operation.
5. Prepare an Incident Management Team (IMT) briefing package.

The PL should complete the following tasks during the transition period:

1. Based upon the FMO recommendation, select and order an IC.
2. Based upon the WFSA initiated by the FMO, complete and approve the WFSA.
3. Prepare a Delegation of Authority, which would include assigning a Resource Advisor and establish a procurement protocol for the IMT.
4. Consider using a Unified Command and convening a Multi-Agency Coordination (MAC) group.
5. Approve an Incident Command Post (ICP) location.
6. Negotiate supplemental agreements, as necessary.
7. Prepare and deliver an Agency Administrator's briefing.

Suppression Conditions

As the dispatch cards indicate, the engines from cooperating agencies provide a critical resource for fire suppression. Often, cooperators are notified before the Monument and often are able to respond to the scene quicker. During the summer months, the fuel is cured and often dry, fuel moisture averages during the summer months is 4%. Monthly windspeeds average 6-8mph, but daily observations with windspeed over 20mph is common. We have addressed these conditions in the fire behavior section above. Extensive, available, flashy fuel with strong wind is a prescription for large fire and extreme fire behavior. These conditions suggest that direct attack should be the exception while the use of indirect attack through burnout from existing barriers is the preferred strategy.

We generally avoid the use of any heavy equipment, but the use of foam, retardant and helicopter are all available resources. Of these, foam is most readily available while the aircraft require approximately 30 minutes to be deployed.

Wildland Fire Situation Analysis

Prepare a WFSA (see dispatch plan) for fires that cannot be contained by the beginning of the second full operational period or when implementing a strategy different from the dispatch card. The Incident Commander, in conjunction with both the FMO and PL, will prepare the WFSA. Approval of the WFSA

resides with the Monument PL.

The purpose of the WFSA is to allow for a consideration of alternatives by which a fire may be controlled. Damages from the fire, suppression costs, safety, and the probable character of suppression actions are some important considerations.

Public safety will require coordination between all monument staff and the IC. Notices should be posted to warn visitors, trails may be closed, traffic control will be necessary where smoke crosses roads, etc. Where wildland fires cross roads, the burned area adjacent to the road should be mopped up and dangerous snags felled. Every attempt will be made to utilize natural and constructed barriers, including changing fuel complexes, in the control of wildland fire. Rehabilitation efforts will concentrate on the damages done by suppression activities rather than on the burned area itself.

Complexity Analysis
A complexity analysis is integral to the WFSA process. A properly executed complexity analysis indicates what level of management team is needed to manage an emerging incident. The Step-up plan calls for the FMO to complete a Complexity Analysis each day when the staffing class is four or five.

Delegation of Authority
When an Incident Management Team takes over management for an incident, or whenever anyone other than a Monument employee manages an incident on Monument grounds, then a Delegation of Authority should be prepared. The elements of a Delegation of Authority includes

- Delegation of full responsibility and authority for incident management under prescribed terms and conditions.
- Terms, conditions, and limitations of the authority granted including both suppression standards in sensitive areas, as well as cost restraints.
- Local fire policy.
- Delineation of line of authority.
- Establish and prioritize suppression objectives for incident control.
- Establish initial attack responsibilities on the remainder of the Monument.
- Direction for unified command.
- Documentation requirements.
- Direction for media relations.
- Direction for incident management reporting.
- Termination conditions.
- Other terms and conditions established by the local jurisdiction administrator, e.g. an Agency and/or resource advisor to the team.

This formal process creates the performance standards for the team. The Delegation of Authority should identify an Agency and/or Resource advisor, the suppression objectives for the incident, the initial attack responsibilities during the delegation, a set of basic guidance documents, a set of cost constraints, an indication of suppression strategies and tactics, and indicate any special management areas.

Aircraft Operations
Aircraft may be used in all phases of fire management operations. All aircraft must be Office of Aircraft Services (OAS) or Forest Service approved. An Aviation Policy Department Manual will be provided by

OAS. The use of aircraft should use the Bureau of Land Management's Form 9400-1a form entitled Aircraft Flight Request/Schedule (Appendix H). This form provides detailed information on the flight and establishes critical control procedures such as flight following. A hazard analysis checklist is included that provides guidance for safety procedures. In addition to the 9400-1a form, the Monument has adopted the Department of Energy Richland Operations' Flight and Ground Hazard Briefing form and Aircraft Preflight Checklist and Safety Meeting Documentation form. DOE-RL has an aerial hazard map for the Hanford Site that we also use. On the Monument, this map identifies wildlife sites that should be avoided, as well as power lines that are hazardous. The map includes a number of hazard located within the central Hanford site that only indirectly affect FWS operations.

Helicopters may be used for reconnaissance, bucket drops and transportation of personnel and equipment. Natural helispots and parking lots are readily available in most cases. Clearing for new helispots should be avoided where possible. Improved helispots will be rehabilitated following the fire.

As in all fire management activities, safety is a primary consideration. As part of the risk management process, aviation users should ask themselves the following questions.

- Is this flight necessary?
- Who is in charge?
- Are all hazards identified and have you made them known?
- Should you stop the operation or flight because of : change in condition? communications? Confusion? Personnel? Weather? Turbulence? Conflicting priorities?
- Is there a better way to do it?
- Are you driven by an overwhelming sense of urgency?
- Can you justify your actions?
- Are there other aircraft in the area?
- Do you have an escape route?
- Are there any rules being broken?
- Are communications getting tense?
- Are you deviating from the assigned operation or flight?

The OAS has produced a card that lists the Five Steps to a Safe Flight. Step one is to check both aircraft and pilot for an approved and current data card. Step two is prepare a flight plan and establish flight following procedures. Step three is to ensure that personal protective equipment is in use. Step four is to brief the pilot on the mission and discuss the flight hazards. Step five is to give, or obtain a passenger briefing that includes aircraft hazards, seat belt, Emergency Location Transmitter and survival kit, first aid kit, cargo stowing procedures, fire extinguisher, shut-offs for fuel and electricity, Oxygen equipment, emergency procedures, and smoking. Qualified aviation personnel will be assigned to all flight operations. The Department requires that all employees complete the OAS course B-3, Basic Aviation Safety every three years. Fireline supervisors should complete S-270 Basic Air Operations.

The monument is developing an aviation safety plan. The plan will address aviation hazards, pilot briefings and maps. Aviation hazards consist of static features including power lines and towers, and dynamic features like military training routes. Managing the airspace during an incident would require cooperation with the Departments of Energy and Defense. Typically, a temporary flight restriction is placed over an incident by the Federal Aviation Administration through a request placed at the Central Washing Interagency Communication Center. The Air Operation Branch Director then controls the incident airspace.

The Pacific Northwest Mobilization Guide lists numerous aviation resources including airport information, aircraft on contract, and procedures. This Guide is updated annually by the Pacific Northwest Wildfire Coordinating Group. The cities in the following (table 10) are located close to the monument and have commercial airfields.

CITY	AIRFIELD NAME	MNEMONIC
Pasco	Tri-Cities Airport	PSC (with OMNI)
Richland	Richland	RLD
Kennewick	Vista Field	S98
Desert Aire	Desert Aire	M94
Othello	Othello	S70
Prosser	Prosser	S40
Warden	New Warden	2S4
Moses Lake	Grant County International	MWH (with OMNI)
Wenatchee	Pangborn Memorial	EAT (with OMNI)
Ellensburg	Bowers	ELN (with OMNI)
Yakima	Yakima	YKM (with OMNI)

EMERGENCY STABILIZATION AND REHABILITATION

Burned area Emergency Stabilization and Rehabilitation (ESR) activities are integral part of wildland fire incidents. Emergency stabilization is the use of appropriate techniques both to protect public safety and to prevent further degradation of cultural and/or natural resources not only within the perimeter of the burned area, but also areas downstream impacted by erosion and invasion of undesirable species. Rehabilitation, on the other hand, is the use of appropriate techniques to improve natural resources as stipulated in approved refuge management plans, as well as the repair or replacement of minor facilities damaged by the fire.

A template for an ESR plan is in the Appendix. The template includes all necessary sections for a complete ESR project and facilitates not only the original submission of the plan, but provides for tracking progress and submitting a final report. The template consists of nine parts and four appendices. The ESR should be based upon other resource management planning or guidance documents in addition to this Fire Management Plan. These other planning documents will provide the guidance for the final rehabilitation goal.

Prior to the completion of an ESR, rehabilitation may be initiated by the Incident Commander, FMO, or Monument Manager. A set of standard treatments for slopes, channels, and roads are pre-approved and listed in the Fire Management Handbook on pg. 5.2-1.

If emergency rehabilitation measures are needed or if rehabilitation is needed to reduce the effects of a wildland fire then the Monument can request appropriate funding through the Burned Area Emergency Rehabilitation (BAER) fund. ESR plans for each fire will be reviewed by the Fire Analysis Committee. A final plan will be submitted to Region for establishing an account. Rehabilitation should be initiated prior to complete demobilization or early the following season.

REQUIRED REPORTING

The IC will be responsible for documenting decisions and completing the fire report (e.g., ICS-214, DI-1202, examples in Appendix H). The FMO will be responsible for any additional required reports. All fires should be reviewed and the level of review depends upon the circumstances. Simple "hotline" reviews occur as an incident evolves while a national level review involves multiple personnel and a published document. The Fire Management Handbook lists the review procedure, a suggested outline for the report, and an extensive list of sample questions for the review.

FIRE INVESTIGATION

Fire management personnel will attempt to locate and protect the probable point of origin and record pertinent information required to determine fire cause. They will be alert for possible evidence, protect the scene and report findings to the fireline supervisor.

Wildland fire that is tied to some type of human activity is a possible trespass case subject to civil or criminal penalties. Prompt and efficient investigation of all suspicious fires will be carried out. However, fire management personnel should not question suspects or pursue the fire investigation unless they are currently law enforcement commission qualified.

Personnel and services of other agencies may be utilized to investigate wildland fire arson or fire incidents involving structures. Qualified fire investigators are available from both federal and local agencies.

PRESCRIBED FIRE ACTIVITIES

Although fire is an integral component of most ecosystems, the shrub-steppe ecosystem is fire intolerant. Therefore, we will rarely apply prescribed fire to the shrub-steppe. Fire is a tool that can accomplish resource management objectives. These objectives include, but are not limited to: enhancing wildlife and plant species populations, reducing hazardous fuels, eliminating exotic or alien species, promoting biological diversity, preserving endangered species, and disposing vegetative waste and debris.

In all uses of prescribed fire, there are consistent management requirements. These include measurable objectives, qualified personnel, quantified ranges of conditions under which burns will be conducted, a description of actions which will be taken if these conditions are exceeded, a monitoring and documentation process, and a review and approval process.

Prescribed fires involve the use of fire as a tool to achieve management objectives. Research burning may also be conducted when determined to be necessary for accomplishment of research project objectives. Actions included in the prescribed burn program include: the selection and prioritization of prescribed burns to be carried out during the year, prescribed burn plans, burn prescriptions, burn operations, documentation and reporting, and burn critiques. Measures to ensure the successful implementation of the prescribed fire program are to:

- Conduct a vigorous prescribed fire program with the highest professional and technological standards;
- Identify the prescribed burn type most appropriate to specific situations and areas;
- Efficiently accomplish resource management objectives through the application of prescribed fire;
- Continually evaluate the prescribed fire program to better meet program goals by refining prescriptions treatments and monitoring methods, and by integrating applicable technical and scientific advancements;
- Prepare prescribed burn plans with a review by a qualified Prescribed Burn Boss, and approval by both the FMO and the PL.
- Conduct prescribed burns with an adequate number of qualified personnel to conduct the burn as well as to mop-up.

The prescribed fire program includes the potential use of mechanical as well as chemical treatments to reduce hazardous fuels if these treatments are necessary to minimize the risk of prescribed fire. Prescribed fire must follow these treatments. The Regional Fire Management Coordinator can approve the use of mechanical and/or chemical removal alone (no application of fire) if there is a risk to adjacent resources or structures.

PRESCRIBED BURN PROGRAM OBJECTIVES

Prescribed fire can be a useful tool for reducing hazardous fuel accumulations, improving wildlife habitat and eliminating exotic vegetation to restore and maintain natural conditions and processes at the Monument.

The goals of prescribed fire are reduce hazardous fuel accumulations, improve wildlife habitat and eliminate exotic vegetation to restore and maintain natural conditions and processes at the Monument. Specific management needs for the Monument, as a whole and for specific areas, will be determined annually and discussed with the Fire Analysis Committee. Specific burn objectives, fire frequency

rotation, firing methodology, and prescriptions will vary from year to year. Burn plans will be updated to reflect any variations. Prescribed fire plans must be approved by both a qualified prescribed fire burn boss (qualified at the level of complexity, as detailed in FIREBASE, for the planned burn) and the Monument FMO prior to submission to the PL for final approval. Under no circumstances should the FMO prepare and approve the same plan.

The Monument does not have an extensive prescribed fire history. However, the amount of hazardous fuels that accumulate within the Monument boundaries and the pervasiveness of exotic species such as cheatgrass and Russian olive can be treated with fire for management purposes. We envision a prescribed fire program that will address the fuel accumulations annually as well as use fire around the wetlands for habitat improvement. Because the majority of the monument is upland habitat that is not tolerant of the application of fire, prescribed fire will rarely be applied to this habitat.

The monument reserves the option to utilize an interagency team approach for complex burns carried out on the boundaries and close to developed areas or burns of large acreage. The most highly qualified and experienced personnel in the regional interagency community would be requested to serve on this team.

PRESCRIBED FIRE MANAGEMENT STRATEGIES

Prescribed fire will be used to reduce hazard fuel accumulation, restore fire to fire-dependent ecological communities, improve wildlife habitat, and to maintain cultural/ historic scenes where appropriate. All prescribed fire activity will comply with applicable Federal, state, and local air quality laws and regulations.

All prescribed fire projects will have a burn plan approved by both a qualified Burn Boss and the FMO. Under no circumstances will the FMO write and approve their own plan. Each burn plan will be prepared using a systematic decision-making process, and contain measurable objectives, predetermined prescriptions, and using an approved environmental compliance document. Appropriate NEPA documentation (Appendix H) exists for this Fire Management Plan. Therefore, additional NEPA documentation will be necessary only for prescribed fire projects not meeting the criteria outlined in this Plan.

Prescribed Fire Burn Plans must include components such as a Go/ No-Go Checklist, contingency actions to be taken in the event the prescription is exceeded, and the need for alerting neighbors and appropriate public officials to the timing and the planing of the burn. A burn plan format meeting all required needs is located in Appendix G.

Fire monitoring will be used to evaluate the degree to which burn objectives are accomplished. Monitoring can assist managers in documenting success in achieving overall programmatic objectives and limiting occurrence of undesired effects.

PRESCRIBED FIRE PLANNING

Annual Activities

Prescribed Fire activities will be reviewed by the Fire Analysis Committee. At the fall meeting, the committee will begin to identify the prescribed fire projects that the FMO will submit into FIREBASE. All prescribed fire projects must have a FIREBASE project number. The Complexity Analysis in FIREBASE will determine the qualifications needed to carry out the burn (i.e. RXB3 for complexity

values less than 115, RXB1 for complexity values exceeding 280). The Regional Office staff will consider submitted projects for approval. Approved projects will have a project ceiling established to be used for maintaining fiscal integrity. Accomplishment reports against the project ceiling will be reported in FIREBASE.

Necessary updates or changes to the Fire Management Plan will be accomplished prior to the next fire season. Any additions, deletions, or changes will be reviewed by the Monument PL to determine if such alterations warrant a re-approval of the plan.

The FMO will be responsible for completing an annual fire summary report. The report will contain the number of fires by type, acres burned by fuel type, cost summary, personnel utilized, and fire effects.

Management Unit Objectives

The Monument's prescribed burning objectives are to reduce hazardous fuel accumulations, improve wildlife habitat, and eliminate exotic vegetation and restore natural vegetation. The purpose of fuels management is to complement the fire management program by reducing fire hazards, decreasing the potential damage to monument resources, adjacent lands, and minimizing risks to employees, residents and visitors. The purpose of wildlife habitat improvement is to use fire to manage vegetation that provides the greatest benefit to wildlife species. The purpose of removing exotic species to restore natural vegetation is to use fire to efficiently eliminate those exotic species and use fire as one step int the process to restore the natural, fire-tolerant vegetation.

This plan calls for full suppression of all wildland fires, both natural and human-caused, for each of the units of the monument. Any prescribed fire outside prescription will be designated a wildland fire and will be immediately suppressed.

Prescribed Burn Plan

The Prescribed Burn Boss will conduct a field reconnaissance of the proposed burn location with members of the Fire Analysis Committee to discuss objectives, special concerns, and gather all necessary information to write the burn plan. After completing the reconnaissance, the Prescribed Burn Boss should write the prescribed burn plan.

All prescribed fires will have prescribed burn plans that meet not only the elements listed in 621 FW 3 but also the Prescribed Fire Plan Elements listed in the Fire Management Handbook (pp. 2.1-2 to 2.1-4). Prescribed Burn Plans will follow the format contained in Appendix G. The prescribed burn plan is a site specific action plan describing the purpose, objectives, prescription, and operational procedures needed to prepare and safely conduct the burn. The treatment area, objectives, constraints, and alternatives will be clearly outlined. No burn will be ignited unless both the Prescribed Fire Burn Boss and the Project Leader sign the Go-No Go checklist. Fires not within the prescription parameters will be suppressed.

Strategies and Personnel

Execution of prescribed burns will use only qualified personnel. The Prescribed Burn Boss will fill all required positions to conduct the burn with qualified personnel. All personnel listed in the burn plan must be available for the duration of the burn or the burn will not be initiated.

The Fire Management Handbook lists thirteen prescribed fire situations that shout watch out.

- You are burning with a plan that has not been approved by the appropriate line officer.

- You are not a qualified burn boss but have been told to fo ahead and burn.
- The objective of the burn is not clear.
- There are areas of special concern within the burn that cannot be burned.
- Private land or structures adjoin the burn.
- You are uncomfortable with the prescription.
- You have not requested a spot weather forecast.
- You decide a test fire is unnecessary
- You decide all your people are old hands and no briefing is necessary
- Escape probability is small, so you don't bother with escape planning.
- You, or the firing boss, are beginning to lose control of your torch people.
- Mop-up and patrol instructions are not specific, or understood by the mop-up boss.
- You haven't lost one in a long time and are starting to feel smug.

Weather and fuel moisture conditions must be monitored closely in planned burn units to determine when the prescription criteria are met. When all prescription criteria are within the acceptable range, the Prescribed Burn Boss will select an ignition date based on current and predicted weather forecasts. A thorough briefing will be given by the Prescribed Burn Boss and specific assignments and placement of personnel will be discussed. An updated spot weather forecast will be obtained on the day of ignition and all prescription elements will be rechecked to determine if all elements are still within the approved ranges. If all prescription elements are met, a test fire will be ignited to determine on-site fire behavior conditions as affected by current weather. If conditions are not satisfactory, the test fire will be suppressed and the burn will be rescheduled. If conditions are satisfactory the burn will continue as planned.

A qualified Incident Commander Type III will be available within a four hour response. If the prescribed burn escapes the predetermined burn area, all further ignition will be halted except as needed for suppression efforts. Suppression efforts will be initiated, as discussed in the preburn briefing. The FMO will be notified immediately of any control actions on a prescribed burn. If the burn exceeds the initial suppression efforts, the burn will be declared a wildland fire and suppressed using guidelines established in this plan. A WFSA will be completed and additional personnel and resources ordered as determined by the Incident Commander. If the fire continues to burn out of control, additional resources will be called from the local cooperating agencies via the servicing dispatch. A management overhead team may be requested to assume command of the fire.

Monitoring and Evaluation

Monitoring of prescribed fires is intended to provide information for quantifying and predicting fire behavior and its ecological effects on monument resources while building a historical record. Monitoring measures the parameters common to all fires: fuels, topography, weather and fire behavior. In addition, ecological changes such as species composition and structural changes will be monitored after a fire. This information will be very useful in fine-tuning the prescribed burn program.

All wildland fires will be appropriately suppressed. However, monitoring wildland fires may be appropriate and potentially valuable in mapping and documenting the growth of the fire, measuring on-site weather and fuel loading to provide the fire staff with present and expected fire behavior and effects. During prescribed burns, monitoring can serve as a precursor to invoking suppression action by determining if the fire is in prescription, assessing its overall potential, and determining the effects of the prescribed burn.

During prescribed burning, monitoring should include mapping, weather, site and fuel measurements and direct observation of fire characteristics such as flame length, rate of spread and fire intensity. Operational monitoring provides a check to insure that the fire remains in prescription and serves as a basis for evaluation and comparison of management actions in response to measured, changing fire conditions, and changes such as fuel conditions and species composition.

All fires may be monitored regardless of size. The FMO will establish specific fire information guidelines for each fire to update intelligence about the fire. Highest priority for monitoring will be assigned to large fires or fires which threaten to leave the monument.

Required Reports

All prescribed burn forms will be completed as outlined by the Prescribed Burn Boss. A monitor will be assigned to collect all predetermined information and complete all necessary forms prior to, during, and after the burn. All records will be archived in the monument's fire records for future use and reference.

The Prescribed Burn Boss will prepare a final report on the prescribed burn for the Fire Analysis Committee. Information will include a narrative of the burn operation, a determination of whether objectives were met, weather and fire behavior data, map of the burn area, photographs of the burn, number of work hours, and final cost of the burn.

Prescribed Burn Critique

The Fire Analysis Committee will critique each prescribed burn. A report detailing the actual burn will accompany any recommendations or changes deemed necessary in the program. This report will be submitted to the Monument Project Leader. A post-season critique of the fire management program, including the prescribed burn program, will be held each year by the Fire Analysis Committee at the conclusion of the fall fire season.

AIR QUALITY / SMOKE MANAGEMENT GUIDELINES

The State of Washington has implemented a Clean Air Act (70 RCW Chapter 70.94). The monument must comply with the Washington Clean Air Act. The Washington Administrative Code 173-425-030 includes the following definitions.

"(16) Outdoor burning means the combustion of material of any type in an open fire or in an outdoor container without providing for the control of combustion or the control of emissions from the combustion. For the purposes of this rule, 'outdoor burning' means all types of outdoor burning except agricultural burning and silvicultural burning.

"(1) Agricultural burning means outdoor burning regulated under chapter 173-430 WAC, including, but not limited to, any incidental agricultural burning or agricultural burning for pest or disease control.

"(23) Silvicultural burning means outdoor burning relating to the following activities for the protection of life or property and/or the public health, safety, and welfare: (a) abating a forest fire hazard; (b) prevention of a forest fire hazard; (c) instruction of public officials in methods of forest fire fighting; (d) any silvicultural operation to improve the forest lands of the state; and (e) silvicultural burning used to improve or maintain fire dependent ecosystems for rare plants or animals within state, federal, and private natural area preserves, natural resource conservation areas, parks, and other wildlife areas.

"(9) Land clearing burning means outdoor burning of trees, stumps, shrubbery, or other natural vegetation from land clearing projects (i.e., projects that clear the land surface so it can be developed, used for a different purpose, or left unused).

"(11) Natural vegetation means unprocessed plant material from herbs, shrubbery, and trees, including grass, weeds, leaves, clippings, prunings, brush, branches, roots, stumps, and trunk wood.

"(25) Tumbleweed burning means outdoor burning to dispose of dry plants (typically Russian Thistle and Tumbleweed Mustard plants) that have been broken off, and rolled about, by the wind.

"And (27) Weed abatement fires means any outdoor burning to dispose of weeds that is not regulated under chapter 173-430 WAC, which applies to agricultural burning."

The Washington Clean Air Act says, "The department of natural resources shall have the responsibility for issuing and regulating burning permits required by it relating to the following activities for the protection of life or property and/or for the public health, safety, and welfare: (a) abating a forest fire hazard; (b) prevention of a fire hazard; ...(e) silvicultural burning used to improve or maintain fire dependent ecosystems for rare plants or animals within state, federal, and private natural preserves, natural resource conservation areas, parks and other wildlife areas (RCW 70.94.660(1))."

The Revised Code of Washington defines forest land to include, "Sagebrush and grass areas east of the summit of the Cascade mountains may be considered forest lands when such areas are adjacent to or intermingled with areas supporting tree growth (RCW 76.04.005(8)." Despite this, the Department of Natural Resources has recommended that the Department of Ecology regulate our smoke management.

Currently, prescribed fire burn plans are submitted to Ecology for permitting, except in Benton County. Once a permit is issued, Ecology makes daily determinations about allowing burning in individual counties.

FIRE RESEARCH

The Monument has no active fire research projects ongoing.

PUBLIC SAFETY

The Monument is dedicated to ensuring the safety of each visitor and to all residents and property adjacent to the monument's boundary. The Fire Analysis Committee will recommend when such restrictions are necessary. Closures will be authorized by the Monument PL. The Fire Analysis Committee will make closure recommendations based upon the following guidelines (Table 11).

The FMO will recommend that the Project Leader consider closing monument land based upon evaluating each element in the following table and select a yes or no. Consider factor E separately.

FACTOR A. FIRE BEHAVIOR	**YES**	**NO**
Burning index in fuel model T greater than 76. (97th percentile BI)		
Crowning or spotting observed.		
Rate of spread in fuel model T greater than 80 chains/hour (97th percentile Spread Component)		
Fire size greater than 5,000 acres		
More than one class C fire burning simultaneously		
TOTAL		
FACTOR B. PERSONNEL COMMITTED MONUMENT-WIDE	**YES**	**NO**
Initial attack forces on dispatch card unavailable		
Resources from the Monument's cooperating agencies crews unavailable		
Monument's collateral duty firefighters committed		
Multiple fire occurrences on Monument lands		
Relief resources more than 2 hours away		
TOTAL		

FACTOR C. OPERATIONS	YES	NO
Access/egress route likely to be heavily used by suppression traffic		
Extensive air operation in vicinity of developed areas		
Potential incident base location in area which conflicts with routine visitor use		
TOTAL		
FACTOR D. LOCATION AND DIRECTION OF SPREAD	**YES**	**NO**
Fire moving toward developed area		
TOTAL		
FACTOR E. EXIT	**YES**	**NO**
Only vehicular egress route(s) directly threatened for extended period (e.g. to point where no traffic could safely get through)		
TOTAL		

If more elements are yes for a letter factor, then that factor is positive.

- If E is "no" and one other primary factor (A-D) is "yes," then consider a full or partial closure.
- If E is "no" and two other primary factors (A-D) is "yes," then consider a full or partial closure and evacuation of visitors.
- If E is "no" and three other primary factors (A-D) is "yes," then consider a full or partial evacuation of visitors.
- If E is "yes," then evacuate visitors from the affected area.

A partial closure or evacuation would be restricted to a specific area, while a full closure or evacuation would be for all visitors at the entrance points and all employees within the monument boundary.

Areas of fire activity will be clearly signed at visitor centers and bulletin boards. Residents adjacent to the monument will be notified in advance of any prescribed burn and if any fire poses a threat to burn outside the monument boundaries.

During prescribed burns at least one burn team member will have first aid training. A first aid kit will be on-site for prescribed burns as well as wildland fires. The local police, fire, and emergency medical services will be notified prior to the ignition of any prescribed burn. They will also be notified of the location of any wildland fires.

PUBLIC INFORMATION AND EDUCATION

Educating the public on the value of fire as a natural process is important to increasing public understanding and support for the fire management program. The monument will use the most appropriate and effective means to explain the overall fire and smoke management program. This may include supplemental handouts, signing, personal contacts, auto tour routes, or media releases. When deemed necessary, interpretive presentations will address the fire management program and explain the role of fire in the environment.

The public information program will be developed as follows:

- Concepts of the prescribed burn program will be incorporated, as appropriate, in publications, brochures, and handouts.
- During periods when prescribed burns are ignited, handouts will be prepared and distributed to all visitors entering into the safe vicinity of fire activity.
- The fire management program may be incorporated into visitor contacts. Particular attention will be given when fires are conspicuous from roads or visitor use areas.
- News releases will be distributed to the media as appropriate.
- The public information outlets of neighboring and cooperating agencies and the regional office will be provided with all fire management information.
- The fire management program will be discussed in informal talks with all employees , volunteers, residents, and neighbors.

Prior to the lighting of any planned ignition, information will be made available to visitors, local residents, and/or the press about what is scheduled to happen and why. On-site information will be provided to alleviate visitor concern about the apparent destruction of resources by fire or the impairment of views due to temporary smoke. This information will include prescribed burn objectives and control techniques, current fire location and behavior, effects caused by the fire, impacts on private and public facilities and services, and restrictions and closures.

As outlined in the prevention section, emergency closures or restrictions may become necessary during periods of extreme or extended fire danger.

FIRE CRITIQUES AND ANNUAL PLAN REVIEW

FIRE CRITIQUES

Fire reviews will be documented and filed with the final fire report. All fires should be reviewed to determine what could be improved either for operational efficiency or fire management efficiency. The Fire Management Handbook has an extensive list of sample questions for a fire review covering the pre-fire conditions and the suppression actions concentrating on operations, logistics finance, planning and command. The FMO will retain a copy for the monument files.

ANNUAL FIRE SUMMARY REPORT

The FMO will be responsible for completing an annual fire summary report. The report will contain the number of fires by type, acres burned by fuel type, cost summary (prescribed burns and wildland fires), personnel utilized, and fire effects. This report would be submitted to the Fire Analysis Committee.

ANNUAL FIRE MANAGEMENT PLAN REVIEW

The Fire Analysis Committee will annually review the Fire Management Plan. Any additions, deletions, or changes will be reviewed by the Monument PL to determine if such alterations warrant a re-approval of the plan. Necessary updates or changes will be accomplished prior to the next fire season.

CONSULTATION AND COORDINATION

The following agencies, organizations and/or individuals were consulted in preparing this plan.

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Paula Call, Outdoor Recreation Planner, Hanford Reach National Monument

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Keith Satterfield, Fire Management Officer, Little Pend Oreille NWR, Colville, WA

Nez Perce Tribe

Confederated Tribes of the Umatilla Indian Reservation.

Yakama Indian Nation.

Wanapum Band

Benton County Emergency Services.

County Commisions for Benton, Franklin, and Grant Counties

Hanford Fire Department.

James Spraklen, Department of Energy

Tri-County Fire Chiefs Association

APPENDICES

APPENDIX A: REFERENCES CITED

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APPENDIX B: DEFINITIONS

Air Tanker: Fixed-wing aircraft certified by FAA as being capable of transport and delivery of fire retardant solutions.

Agency Administrator. The appropriate level manager having organizational responsibility for management of an administrative unit. May include Director, State Director, District Manager or Field Manager (BLM); Director, Regional Director, Complex Manager or Project Leader (FWS); Director, Regional Director, Park Superintendent, or Unit Manager (NPS), or Director, Office of Trust Responsibility, Area Director, or Superintendent (BIA).

Appropriate Management Action. Specific actions taken to implement a management strategy.

Appropriate Management Response. Specific actions taken in response to a wildland fire to implement protection and fire use objectives.

Appropriate Management Strategy. A plan or direction selected by an agency administrator which guide wildland fire management actions intended to meet protection and fire use objectives.

Appropriate Suppression. Selecting and implementing a prudent suppression option to avoid unacceptable impacts and provide for cost-effective action.

Bureau. Bureaus, offices or services of the Department.

Burning Index: An estimate of the potential difficulty of fire containment as it relates to the flame length at the head of the fire. A relative number related to the contribution that fire behavior makes to the amount or effort needed to contain a fire in a specified fuel type. Doubling the burning index indicates that twice the effort will be required to contain a fire in that fuel type as was previously required, providing all other parameters are held constant.

Burning Period: The part of each 24-hour period when fires spread most rapidly; typically from 10:00 am to sundown.

Class of Fire (as to size of wildland fires):
Class A - ¼ acre or less.
Class B - more than ¼ but less than 10 acres.
Class C - 10 acres to 100 acres.
Class D - 100 to 300 acres.
Class E - 300 to 1,000 acres.
Class F - 1,000 to 5,000 acres.
Class G - 5,000 acres or more.

Closure: Legal restriction, but not necessarily elimination, of specified activities such as smoking, camping, or entry that might cause fires in a given area.

Cold Trailing: A method of controlling a partly dead fire edge by carefully inspecting and feeling with the

hand for heat to detect any fire, digging out every live spot, and trenching any live edge.

Condition of Vegetation: Stage of growth or degree of flammability of vegetation that forms part of a fuel complex. Herbaceous stage is at times used when referring to herbaceous vegetation alone. In grass areas minimum qualitative distinctions for stages of annual growth are usually green, curing, and dry or cured.

Confine a Fire: The least aggressive wildfire suppression strategy, typically allowing the wildland fire to burn itself out within determined natural or existing boundaries such as rocky ridges, streams, and possibly roads.

Contain a Fire: A moderately aggressive wildfire suppression strategy which can be expected to keep the fire within established boundaries of constructed firelines under prevailing conditions.

Control Line: An inclusive term for all constructed or natural barriers and treated fire edges used to control a fire.

Creeping Fire: Fire burning with a low flame and spreading slowly.

Crown Fire: A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as running or dependent to distinguish the degree of independence from the surface fire.

Crown out: A fire that raises from ground into the tree crowns and advances from tree top to tree top. To intermittently ignite tree crowns as a surface fire advances.

Direct Attack: Any treatment applied directly to burning fuel such as wetting, smothering, or chemically quenching the fire or by physically separating the burning from unburned fuel.

Dispatch Center: A facility from which resources are assigned to an incident.

Dozer: Any tracked vehicle with a front mounted blade used for exposing mineral soil.

Dozer Line: Fireline constructed by the front blade of a dozer.

Drought Index: A number representing the net effect of evaporation, transpiration and precipitation in producing cumulative moisture depletion in deep duff or upper soil layers.

Elapsed Time Standards: Maximum amounts of time allowed by administrative rule for given steps of fire suppression.

Emergency Fire Rehabilitation/Burned Area Emergency Rehabilitation (EFR/BAER). Emergency actions taken during or after wildland fire to stabilize and prevent unacceptable resource degradation or to minimize threats to life or property resulting from the fire. The scope of EFR/BAER projects are unplanned and unpredictable requiring funding on short notice.

Energy Release Component (ERC) A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. It is generated by the National Fire Danger Rating System, a computer model of fire weather and its effect on fuels. The ERC incorporates thousand hour dead fuel moistures and live fuel moistures; day to day variations are caused by changes in the moisture content of the various fuel classes. The ERC is derived from predictions of (1) the rate of heat release per unit area during flaming combustion and (2) the duration of flaming.

Engine: Any ground vehicle providing specified levels of pumping water, and hose capacity but with less than the specified level of personnel.

Escaped Fire: Fire which has exceeded or is expected to exceed initial attack capabilities or prescription.

Extended attack. A fire on which initial attack forces are reinforced by additional forces.

False Alarm: A reported smoke or fire requiring no suppression; for example, brush burning under control, mill smoke, false smoke, etc.

Fine Fuel Moisture: The probable moisture content of fast-drying fuels which have a timelag constant of 1 hour or less; such as, grass, leaves, ferns, tree moss, pine needles, and small twigs (0-1/4").

Fire Analysis: Review of fire management actions taken on a specific fire, group of fires, or fire season in order to identify reasons for both effective and ineffective actions, and to recommend or prescribe ways and means of doing a more efficient job. Also called hot line review.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather and topography.

Fire Break: A natural or constructed barrier used to stop or check fires that may occur, or to provide a control line from which to work.

Fire Danger: Sum of constant danger and variable danger factors affecting the inception, spread and resistance to control, and subsequent fire damage; often expressed as an index.

Fire Danger Rating: A fire management system that integrates the effects of selected fire danger factors into one or more qualitative or numerical indices of current protection needs.

Fire Edge: The boundary of a fire at a given moment.

Fire Effects: The physical, biological, and ecological impacts of fire on the environment. Also, any consequences to the vegetation or the environment resulting from fire, whether neutral, detrimental, or beneficial.

Fire intensity. The amount of heat produced by a fire. Usually compared by reference to the length of the flames.

Fireline: The part of a control line that is scraped or dug to mineral soil. Also called fire trail.

Fire management. All activities related to the prudent management of people and equipment to prevent or suppress wildland fire and to use fire under prescribed conditions to achieve land and resource management objectives.

Fire Management Plan. A strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. The plan is supplemented by operational procedures such as preparedness plans, preplanned dispatch plans, prescribed fire plans and prevention plans.

Fire prescription. A written direction for the use of fire to treat a specific piece of land, including limits and conditions of temperature, humidity, wind direction and speed, fuel moisture, soil moisture, etc., under which a fire will be allowed to burn, generally expressed as acceptable range of the various fire-related indices, and the limit of the area to be burned.

Fire Retardant: Any substance except plain water that by chemical or physical action reduces flammability of fuels or slows their rate of combustion.

Fire Suppression Activity Damage. The damage to lands, resources and facilities directly attributable to the fire suppression effort or activities, including: dozer lines, camps and staging areas, facilities (fences, buildings, bridges, etc.), handlines, and roads.

Fire Tool Cache: A supply of fire tools and equipment assembled in planned quantities or standard units at a strategic point for exclusive use in wildland operations.

Fire Weather Forecast: A weather prediction specially prepared for use in wildland fire operations and prescribed fire.

Fire Weather Station: A meteorological station specially equipped to measure weather elements that have an important effect on fire behavior.

Flammability: The relative ease with which fuels ignite and burn regardless of the quantity of the fuels. Preferred to "inflammability."

Flanking Fire Suppression: Attacking a fire by working along the flanks either simultaneously or successively from a less active or anchor point and endeavoring to connect two lines a the head.

Flare-up: Any sudden acceleration in rate of spread or intensification of the fire. Unlike blowup, a flare-up is of relatively short duration and does not radically change existing control plans.

Flash Fuels: Fuels such as grass, leaves, draped pine needles, fern, tree moss and some kinds of slash, which ignite readily and are consumed rapidly when dry.

Foam: The aerated solution created by forcing air into, or entraining air in water containing a foam concentrate by means of suitably designed equipment or by cascading it through the air at a high velocity. Foam reduces combustion by cooling, moistening and excluding oxygen.

Free Burning: The condition of a fire or part of a fire that has not been slowed by natural barriers or by control measures.

Fuels. Materials that are burned in a fire; primarily grass, surface litter, duff, logs, stumps, brush, foliage, and live trees.

Fuel loadings. Amount of burnable fuel on a site, usually given as tons/acre.

Fuel Type: An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions.

Ground Fire: Fire that consumes the organic material beneath the surface litter found, such as peat fire.

Hazard fuels. Those vegetative fuels which, when ignited, threaten public safety, structures and facilities, cultural resources, natural resources, natural processes, or to permit the spread of wildland fires across administrative boundaries except as authorized by agreement.

Hazard Reduction: Any treatment of living and dead fuels that reduces the threat of ignition and spread of fire.

Head Fire: A fire spreading or set to spread with the wind.

Heavy Fuels: Fuels of large diameter such as snags, logs, large limbwood, which ignite and are consumed more slowly than flash fuels. Also called course fuels.

Hot Spot: A particularly active part of a fire.

Hot-spotting: Checking the spread of fire at points of more rapid spread or special threat. Is usually the initial step in prompt control, with emphasis on first priorities.

Incendiary Fire: A wildfire willfully ignited by anyone to burn, or spread to, vegetation or property without consent of the owner or his/her agent.

Incident: An occurrence, either human-caused or natural phenomena, that requires action or support by emergency service personnel to prevent or minimize loss of life or damage to property and/or natural resources.

Indirect Attack: A method of suppression in which the control line is located some considerable distance away from the fire's active edge. Generally done in the case of a fast-spreading or high-intensity fire and to utilize natural or constructed firebreaks or fuel breaks and favorable breaks in the topography. The intervening fuel is usually backfired; but occasionally the main fire is allowed to burn to the line, depending on conditions.

Initial Attack. An aggressive suppression action consistent with firefighter and public safety and values to be protected.

Lookout: (1) A person designated to detect and report fires from a vantage point. (2) A location from which fires can be detected and reported. (3) A fire crew member assigned to observe the fire and warn the crew when there is danger of becoming trapped.

Maintenance burn. A fire set by agency personnel to remove debris; i.e., leaves from drainage ditches or cuttings from tree pruning. Such a fire does not have a resource management objective.

Mop-up: Extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to make a fire safe, or to reduce residual smoke.

Natural fire. A fire of natural origin, caused by lightning or volcanic activity.

National Fire Danger Rating System (NFDRS) Fuel Model. One of 20 mathematical models used by the National Fire Danger Rating System to predict fire danger. The models were developed by the US Forest Service and are general in nature rather than site specific.

National Forest Fire Laboratory (NFFL) Fuel Model. One of 13 mathematical models used to predict fire behavior within the conditions of their validity. The models were developed by US Forest Service personnel at the Northern Forest Fire Laboratory, Missoula, Montana.

National Wildfire Coordinating Group (NWCG): A group formed under the direction of the Secretaries of Interior and Agriculture to improve the coordination and effectiveness of wildland fire activities, and provide a forum to discuss, recommend appropriate action, or resolve issues and problems of substantive nature.

Normal Fire Season: (1) A season when weather, fire danger and number and distribution of fires are about average. (2) Period of the year that normally comprises the fire season.

Operational Period: The period of time scheduled for execution of a given set of tactical actions as specified in the Incident Action Plan. Operational Periods can be of various lengths, although usually not over 24 hours.

Prescribed Burning: Controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions which allows the fire to be confined to a predetermined area, and produce the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives.

Prescribed Fire. A fire ignited by agency personnel in accord with an approved plan and under prescribed conditions, designed to achieve measurable resource management objectives. Such a fire is designed to produce the intensities and rates of spread needed to achieve one or more planned benefits to natural resources as defined in objectives. Its purpose is to employ fire scientifically to realize maximize net benefits at minimum impact and acceptable cost. A written, approved prescribed fire plan must exist and NEPA requirements must be met prior to ignition. NEPA requirements can be met at the land use or fire management planning level.

Prescription. Measurable criteria which guide selection of appropriate management response and actions. Prescription criteria may include safety, public health, environmental, geographic, administrative, social,

or legal considerations.

Preparedness. Actions taken seasonally in preparation to suppress wildland fires, consisting of hiring and training personnel, making ready vehicles, equipment, and facilities, acquiring supplies, and updating agreements and contracts.

Presuppression: Activities in advance of fire occurrence to ensure effective suppression action. Includes planning the organization, recruiting and training, procuring equipment and supplies, maintaining fire equipment and fire control improvements, and negotiating cooperative and/or mutual aid agreements.

Prevention Activities directed at reducing the number or the intensity of fires that occur, primarily by reducing the risk of human-caused fires.

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually it is expressed in chains or acres per hour for a specific period in the fire's history.

Rehabilitation (1) Actions to limit the adverse effects of suppression on soils, watershed, or other values, or (2) actions to mitigate adverse effects of a wildland fire on the vegetation-soil complex, watershed, and other damages.

Reburn: (1) Repeat burning of an area over which a fire has previously passed, but left fuel that later ignites when burning conditions are more favorable; (2) An area that has reburned.

Relative Humidity (RH): The ration of the amount of moisture in the air, to the maximum amount of moisture that air would contain if it were saturated The ratio of the actual vapor pressure to the saturated vapor pressure.

Resources: (1) Personnel, equipment, services and supplies available, or potentially available, for assignment to incidents. Personnel and equipment are described by kind and type, e.g., ground, water, air, etc., and may be used in tactical, support or overhead capacities at an incident. (2) The natural resources of an area, such as timber, grass, watershed values, recreation values, and wildlife habitat.

Risk: (1) The chance of fire starting as determined by the presence and activity of causative agents. (2) A causative agent. (3) (NFDRS) A number related to the potential number of firebrands to which a given area will be exposed during the rating day.

Running Fire: Behavior of a fire spreading rapidly with a well defined head.

Safety Zone: An area cleared of flammable materials used for escape in the even the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. In firing operations, crews progress so as to maintain a safety zone close at hand allowing the fuels inside the control line to be consumed before going ahead. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity.

Smoldering: A fire burning without flame and barely spreading.

Spot Fires: Fire ignited outside the perimeter of the main fire by a firebrand.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and which start new fires beyond the zone of direct ignition by the main fire.

Spread Component: Part of the National Fire Danger Rating System (NFDRS). A rating of the forward rate of spread of a head fire.

Strategy: The general plan or direction selected to accomplish incident objectives.

Suppression. A management action intended to protect identified values from a fire, extinguish a fire, or alter a fire's direction of spread.

Surface Fire: Fire that burns loose debris on the surface, which include dead branches, leaves, and low vegetation.

Tactics: Deploying and directing resources on an incident to accomplish the objectives designated by strategy.

Unified Command: In ICS, unified command is a unified team effort which allows all agencies with jurisdictional responsibility for the incident, either geographical or functional, to manage an incident by establishing a common set of incident objectives and strategies. This is accomplished without losing or abdicating authority, responsibility, or accountability.

Unplanned ignition. A natural fire that is permitted to burn under specific conditions, in certain locations, to achieve defined resource objectives.

Water Tender: Any ground vehicle capable of transporting specified quantities of water.

Wildfire. An unwanted fire occurring on wildland that is not meeting management objectives and thus requires a suppression response.

Wildland Fire. Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Situation Analysis (WFSA). A decision-making process that evaluates alternative management strategies against selected safety, environmental, social, economical, political, and resource management objectives as selection criteria.

Wildland/urban interface fire A wildland fire that threatens or involves structures.

APPENDIX C: STEP-UP PLAN

This step-up uses weather data collected at the Hanford Meteorological Stations, the Juniper Dunes Wilderness Area and the Columbia NWR. The Hanford Data set starts in 1955. Data from the Juniper dunes station exits from 1990 to the present. At Columbia, a data set from 1993 to the present exists. We used FIREFAMILY PLUS to analyze the data.

An analysis for each station using both fuel models A and T results in a step-up plan. A cumulative frequency distribution on burning index yields staffing classes. The 97th percentile establishes staffing class 5, the 90th percentile establishes staffing class 4. Staffing classes 2 and 3 are based upon ¼ and ½ of the 90th percentile value, respectively. Staffing class 1 is the remaining days.

Procedures: each day at 1300 hours (Standard time) an assessment of fire danger will be made. This assessment can be based upon the use of Fire Weather Plus calling the station, or the use of the Weather Information Management System. The latter requires logging on to WIMS

Step 1: Log onto http://www.nps.gov/fire/webterm/firesystem.htm.
Step 2: Select WIMS
Step 3: Log on as FWS0042.
Step 4: select WIMS (again)
Step 5: use didx fastpath.
Step 6: type mcrc for the SIG, select observed data, and date (hours can be left blank).
Step 7: output shows a line for each fuel model and station in the catalog.

Station number 453102 is Columbia NWR, 453201 is Juniper Dunes, and 351316 is Umatilla NWR. The MSGC column identifies the fuel model (M), we use A and T. The column SL indicates the staffing level. A staffing class 4 or 5 requires fire staff to remain on duty past normal hours. Following the afternoon fire weather forecast, an assessment of the potential for extended hours can be forecasted through FIREFAMILY PLUS.

Analyze burning index for both fuel models using both the Columbia and Umatilla Weather Stations. Staffing Class for Columbia and the Hanford Reach National Monument will be based upon the Columbia Station, while Mid Columbia will be based upon the Umatilla Station. If any of the three weather stations is at Staffing level 5 for our fuel models, then other stations are increased in staffing level by one point (e.g., a level 3 for the Umatilla station would be raised to 4 if Columbia is at 5). During fire season, Staffing Class 3 and above, the following work schedule will be followed.

	SUN	MON	TUE	WED	THU	FRI	SAT
Supervis.		On	On	On	On	On	
Tech	On	On	On	On			On
FFT	On	On			On	On	On
FFT	On			On	On	On	On
Lead	On	On	On			On	On
Tech	On	On	On	On	On		
FFT			On	On	On	On	On
FFT	On			On	On	On	On

At the end of the daily work shift, personnel will be on call until the next work-shift begins. I.e., when a fire occurs during the evening, the previous shift personnel are expected to be able to respond.

Staffing class	Model A	Model T	Actions
1	BI < 9	BI < 14	Preparedness: ensure that a type 6 engine is fully equipped with suppression tools. Pump may need to be winterized after usage. Recruit firefighters by April 1 for upcoming fire season. Review cooperative agreements and annual operating plans by April 1.
2	9 ≤ BI < 18	14 ≤ BI < 29	Preparedness: in addition to actions at level 1, perform weekly drills to assure that pump works to minimum specifications, if prior to May 15 or after October 1. Fire personnel complete annual fitness test. Prepare and issue red cards by May 1. Inspect all complex vehicles for inclusion of serviceable fire suppression tools. Complete annual maintenance on firebreaks by May 1. Work schedule for fire personnel not altered (i.e. compressed schedule or standard tour of duty).
3	18 ≤ BI < 36	29 ≤ BI < 58	Preparedness: in addition to actions at level 2, all slip-on units will be operational. Between May 15 and October 1, perform daily drills to assure that pump works to minimum specifications. Ensure all refuge vehicles have serviceable fire suppression tools. Work schedule altered to have seven day coverage. Beginning the first full payperiod after May 15th through the last full pay period in September, the work schedule for field fire personnel is 0930-1800. When in Staffing Class 3, raise staffing class to level 4 for national holidays (Memorial Day. Independence Day, Labor Day) or during red flag warning days
4	6 ≤ BI < 45	58 ≤ BI < 74	Preparedness: in addition to actions at level 3, request emergency preparedness support from Regional Office for additional staffing. Duty hours extended to 0930-2000 if between Memorial Day and Labor Day weekends. Off duty personnel expected to inform FMO of location and availability. Project Leader recommended to limit refuge operations that may increase ignition. FMO to prepare fire complexity analysis and WFSA by 1600 on the first SC 4 day and then review these documents daily for updating, as necessary. Non-fire staff personnel with red cards requested to be available for suppression support including one-hour availability during off-shift hours. When in Staffing class 4, raise staffing class to level 5 for national holidays (Memorial Day. Independence Day, Labor Day) or during red flag warning days. Extend hours to 2200 for Independence Day. When lightning is predicted, patrol until one hour after lightning storms have dissipated. Request additional personnel, as needed, to avoid exceeding more than 16 hours on-duty for each 24 hour period.
5	45 ≤ BI	74 ≤ BI	In addition to actions at level 4, all personnel will be expected to discuss fire danger with visiting public. Non-fire staff personnel with red cards requested to be available for suppression support including fifteen-minute availability during off-shift hours. Project Leader will consider closure of refuge roads with personnel monitoring gates.

COOPERATIVE AGREEMENT
Between
U.S. Fish and Wildlife Service,
Hanford Reach National Monument/
Saddle Mountain National Wildlife Refuge
and
Hanford Fire Department

I. Purpose

A. This Cooperative Agreement is entered into between the following two Parties: the U.S. Fish and Wildlife Service, managing the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge, hereinafter referred to as the Service, and the Hanford Fire Department, hereinafter referred to as the Department.

B. This Agreement establishes guidelines for providing adequate fire protection and wildfire suppression for Service lands described below (see attached map), or other Federal lands.

C. Both the Service and the Department maintain fire protection organizations.

D. Wildland fires on a Party's land may pose a threat to the lands protected by the other Party.

E. It is to the mutual advantage of the Parties to coordinate efforts for the prevention, detection, and suppression of wildfires in and adjacent to their areas of responsibility, to limit duplication and improve both efficiency and effectiveness.

F. It is the intent of this agreement that both Party's resources be available to assist on the lands that the other Party is responsible to protect.

G. The Service land pertinent to this agreement is the Hanford Reach National Monument including the following units: Arid Lands Ecology Reserve, McGee/Riverlands, Saddle Mountain National Wildlife Refuge, and the Wahluke Slope Habitat Management Area.

II. Authority

A. Fire Protection Act of September 20, 1922 (Stat. 857; 16 USC 594).
Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 USC 1856, 1856A and B).

III. Scope of work

A. Preparedness

1. The Service maintains an administrative office in Richland, WA, while the firefighting resources for this agreement are located in both Othello and Burbank, WA, as well as Irrigon, OR. The Department maintains four fire stations on the Hanford Reservation.

2. Each Party recognizes that the other Party's standards are reasonable, prudent, and acceptable.

   a. Both Parties will determine their own, minimum standards for personnel.

   b. Both Parties agree to send only qualified personnel to participate in incidents, thus minimizing liability issues.

   c. The Service expects that the Department will provide personnel that meet the National Wildfire Coordinating Group standards.

3. The Parties agree to cooperate in the development and implementation of prescribed

fire and fuels management programs. Both Parties may provide assistance to the other Party upon request. Reimbursement must be documented in a supplemental project plan for the individual project. (Appendix B).

4. Both Parties agree to notify the other Party of those known Burning Permits and Smoke Management issues that may impact the other Party.

5. Both Parties will cooperate in the gathering, processing, and use of fire weather data.

a. The Service collects weather from Service-owned stations at Irrigon, OR and Othello, WA. The Service also uses fire weather data collected by the Bureau of Land Management at Juniper Dunes Wilderness near Drumheller, WA.

b. The Department does not have the capability to gather fire weather data, but uses Hanford Meteorology Service for climatology.

B. Detection

1. Reported fires from the public that are located in Benton County generally go to the Hanford Fire Dispatch Center. Reported fires from the public that are located north of the Columbia River generally go to the Multi Agency Communication Center in Moses Lake, WA. The Service should be notified immediately of incidents on and near Service land.

2. Both Parties will conduct detection activities, which is the act or system of discovering and locating fires.

C. Notification

1. The Department agrees to promptly use the Service's contact list (see appendix C) to notify the Service of fires burning on Service land.

2. The Service agrees to promptly notify the Department of fires burning on, or threatening, Department land. The Service requires prompt notification for reimbursement to occur.

D. Initial Attack

1. The concept of closest forces is the guiding principle of initial attack suppression, regardless of which Party the forces belong to and regardless of which Party has protection responsibility.

2. Both Parties are authorized to take independent action on Boundary Line Fires, when such fires are a threat to lands protected by the Party taking the independent action.

3. During initial attack, the Department should restrict the use of equipment off established roads to type 6 engines, or grass trucks. The use of heavy equipment, including pumper-tenders, should have the approval of the Service Project Leader, or his/her designee. However, lacking documented ability to obtain concurrence from the Project Leader, the Department IC has the authorization to use the equipment necessary to contain the fire during the initial attack phases.

E. Transition

1. Except for independent actions, or for closest forces, described above, or when a Service IC is not available, the Department should request, and the Service should provide, a Delegation of Authority to manage specific incidents on Service land. The Delegation of Authority will: specify the IC by name; describe the Service's Project Leader's priorities and expectation for managing the incident; identify the Service's Resource Advisor by name; specify how frequently the IC will brief the Service Project Leader on the incident; specify who will coordinate media relations; and, identify how frequently the Delegation of Authority will be evaluated. Firefighting resources operating under a delegation of authority are reimbursable.

2. The Parties will establish a Unified Command structure for boundary line incidents

that threaten the other Party's land. Firefighting resources operating under a Unified Command are reimbursable. The Service can obtain additional fire fighting resources at the Federal Government's expense under a Unified Command structure.

3. The Initial Attack IC may determine the need to use multiple resources to manage the incident.

a. Except as noted in the Dispatch Card, only a Service IC may declare a Type 3 incident on Service Land,

b. However, a Department IC may independently declare that a Type 4 incident has transitioned to a Type 3 Incident on Service land if a documented effort has been made to notify the Service of the need for a Unified Command.

4. When a qualified Service IC arrives on the scene of a Department managed incident on Service land, the Department IC will transfer management of the incident to the Service IC, if requested. A request for transfer should be documented on a General Message Form (ICS Form 213). Unless otherwise requested, the Service will relinquish command to the Department upon the arrival of Department personnel to a Department fire.

IV. Administration

A. Consideration must be given to the health and safety of personnel when assigned to fires. Both Parties agree that Incident Commanders will release suppression resources to their primary responsibilities as soon as priorities allow.

1. Service personnel should not exceed 16 hours of work during a 24 hour period.
2. Incident Commanders shall adhere to rest and rotation policies of the other Party.

B. At the time of the incident, the Parties will determine whose procurement procedures will be utilized. Usually, Federal procurement procedures will be followed for fires on Service Land.

C. Equipment and supplies loaned to the other Party shall be returned in the same condition as when received, reasonable wear and tear excepted. The borrowing Party will repair or reimburse for damages in excess of reasonable wear and tear and will replace or reimburse items lost, destroyed, or expended.

D. Each Party's equipment may be operated and utilized by qualified personnel from the other Party in emergency situations. Personnel from either Party may staff the other Party's suppression resource jointly, as mutually determined necessary.

E. Each Party will notify the other Party of any reimbursable claims within 60 days. The final itemized claim should be processed within 60 days of submission.

1. The Debt Collection Improvement Act of 1996 requires Federal agencies to make electronic funds transfers for reimbursements.

2. Unless already established, the Department must complete and submit a Standard Form 3881-ACH Vendor/Miscellaneous Payment Enrollment Form, which will be provided by the Service, prior to submission of the first invoice for reimbursement

F. Upon timely receipt of an itemized billing, the Service will either reimburse actual suppression costs to the Department, or submit a written statement to the Department disputing the claim. Reimbursement will be at the current Washington State Association of Fire Chiefs Interagency Rate Schedule for vehicles, while reimbursement for personnel wil l be at the Departments actual pay rate.

G. The Party receiving a support action request is not obligated to fulfill the request for resources.

1. Once committed, support actions are reimbursable for a minimum of two hours, regardless of actual time committed.

2. The Service will provide, at its own expense, fire suppression equipment and labor when providing support actions covered in this Plan.

H. Upon submission of sufficient documentation, the Service can reimburse the Department the actual Department rate for personnel requested, and assigned, to support actions, including the overtime premium of required direct replacement (backfill) personnel.

V. Provisions

A. When an accident occurs involving the equipment or personnel of a supporting Party (e.g. when Department personnel are responding to an incident on Service Land at the request of the Service), the affected Party (accident victim) will immediately notify the other Party. As soon as practical, the protection agency (party who is responsible for fire protection on the land where the accident occurred) will initiate an investigation of the accident, using an investigation team consisting of representative of the affected Parties.

B. Each Party is responsible for their own losses arising out of the performance of this Agreement

1. Each Party hereby waives any claim against the other Party for any loss, damage, personal injury, or death of the Party, or its employees or agents, occurring as a consequence of the performance of this Agreement.

2. Neither Party is relieved from responsibility for claims of third parties for losses for which the Party is otherwise legally liable.

3. Damages directly caused by the incident are reimbursable while damages that are attributable to routine work are not reimbursable.

4. The maintenance of equipment needed to fulfill the terms of this Agreement shall be at the expense of the agency that owns or leases the equipment.

C. Amendments or modifications to this Agreement shall be made by mutual consent of both Parties, by the issuance of a written amendment or modification, signed and dated by both Parties, prior to any changes being performed. Neither Party is obligated to fund any changes not properly approved in advance.

D. The Agreement shall commence on the date the last Party signs and shall remain in effect until terminated. Each Party may terminate this Agreement by notifying the other Party in writing of intention to terminate, providing a minimum of 30 days advanced notice of intention to terminate.

E. A Department Incident Commander (IC) taking independent actions on a wildfire must obtain approval from the Project Leader, or his/her designee, to use tractors, graders, dozers, and all other ground surface breaking or modifying equipment. However, the Department IC is authorized to use any resource needed when the documented use of such equipment is essential to protect first, human life and second, both property and natural/cultural resources. If it becomes necessary to prioritize between property and natural/cultural resources, this is done based on relative values to be protected, commensurate with fire management costs. The Department IC will make the final decision to use such equipment and will document that decision on a Unit Log (ICS Form 214), or equivalent.

Appendix A-Glossary of terms

A. Definitions from the Fireline Handbook (PMS 410-1)

1. Initial attack is the actions taken by the first resources to arrive at a wildland fire to protect lives and property, and to prevent further spread of the fire.

2. Detection is the act or system of discovering and locating fires.

3. An escaped fire is a fire that has exceeded, or is anticipated to exceed, the preplanned initial action capabilities.

4. Extended attack is the situation in which the initial attack forces cannot control a fire within a reasonable time, or the Incident Commander is ordering additional resources because the fire has escaped initial attack.

5. Unified Command is a unified team effort of both Parties to manage an incident that threatens, or is affecting, both Party's jurisdiction. In a Unified Command, both Parties agree to a common set of objectives and strategies.

6. A resource order refers to the documented request for additional fire fighting resources (e.g. engines, crews, supplies, overhead, aircraft, equipment, etc.) to be sent to an incident.

B. Definitions from the Master Cooperative Fire Protection Agreement

1. Responsibilities

a. The Service is the jurisdictional agency having overall land and resource management responsibility as described above in 1G.

b. The Department is the protection agency for the Arid Lands Ecology Reserve and the McGee/Riverlands units while the Service is the protection agency on the Saddle Mountain National Wildlife Refuge, and the Wahluke Slope Habitat Management Area..

c. The Service and the Department are Supporting Agencies to each other, available to provide assistance to the other Party on wildfire incidents that occur on the other Party's land described above. This Agreement does not obligate either Party to provide support to the other Party upon receipt of a request for support.

2. Fires detected within one mile of property line are designated as Boundary Line Fires. Because Boundary Line Fires have the potential to cross onto the other Party's land, they are the initial attack responsibility of both Parties. Neither party will assume that the other party is aware of the fire nor that the other party will take action. Both Parties will communicate with the other party about the boundary line condition.

3. Independent action is an action by a Party, on its own initiative, to suppress a fire on land known to be protected by the other Party

4. Wildfires on Service land will, in the beginning, be managed as Type 4 incidents. The Incident Commander is responsible for determining when to manage the fire as a Type 3 incident.

5. A support action is where one Party requests fire suppression resources from the other Party.

6. Reimbursable costs are all costs associated with operations and support ordered on a resource order for an incident within the provisions of this Agreement.

a. Department and Service costs for transportation, salary, overtime and per

diem of individuals assigned to an incident.
b. Additional support dispatching, warehousing or transportation services requested through a resource order.
c. Cost of equipment in support of the incident, contract equipment costs and operation costs for Department or Service-owned equipment.
d. Support Department or Service-owned equipment and supplies lost, damaged, or expended by an agency providing support on the incident.
e. Reasonable and prudent supplies expended in support of the incident.

Appendix B: Sample supplemental agreement

The purpose of this agreement is to provide for a coordinated cooperative fire suppression operation on this fire, and to describe the cost divisions. This agreement is a supplement to the master agreement/contract between the agencies listed.

1. Fire Name: _____ Origin Date _____ Time _____
2. Origin: Township _____ Range _____ Section _____
3. Estimate size: _____ acres at the time of this agreement.
4. U.S. Fish and Wildlife Service Fire Number: _____
5. This agreement becomes effective on: _____ at _____ and remains in effect until amended or terminated.
6. Overall direction of this incident will be by Unified Command.

Position	Name	Agency
Incident Commander		
Agency Representative		
Liaison Officer		
Finance Chief		

7. Suppression action will be subject to the following special conditions or Land Management Objectives: _____
8. Geographic responsibility by Agency is defined as follows: _____

Agency	Geographic Responsibility

9. The Agency Responsible for structural protection will be a Fire Service other than the USFWS.
10. List any special conditions agreed to for the following (with cost share information in item #11).

Air Operations	
Camp and Kitchen	
Public Incident Information	
Fire Investigation	

11. Fire suppression costs will be borne by the U.S. Fish and Wildlife Service
12. Special conditions relative to this agreement: _____
13. It is recognized that each agency has different safety standards and requirements. All employees will meet their own agency standards, regardless of location on the fire.

Signatures:

_____ _____

Project Leader Date

Hanford Reach National Monument /Saddle Mountain National Wildlife Refuge

_____ Date _____

COOPERATOR

APPENDIX E: DISPATCH PLAN

Dispatching firefighting resources is based upon incremental responses recommended by the dispatch card. In general, Memorial Day through Labor Day we are in staffing class three or above. At staffing class three, we staff two engines seven days per week. At higher staffing classes, increased hours are authorized and off-duty personnel are requested to let management know of their availability. A set of daily procedures follows.

Daily Procedures

During typical wildland fire season (Memorial Day through Labor Day), a series of daily procedures occur. Assuming that a typical shift is from 0930 to 1800, the planning begins at 1400 the day before. The 1400 weather observation provides information for the fire danger assessment. We obtain fire danger indices from one of two sources: directly from Fire Weather Plus 2000 (FWP) or from the Weather Information Management System (WIMS). The FMO calls the weather station using FWP. Concurrently, the same data are downloaded onto WIMS for later editing by the Central Washington Interagency Communication Center. The NFDRS outputs from the 1400 observation combined with the morning forecast for the next day should be used in the FIREFAMILY PLUS Fire Danger Calculator to assess that fire danger for the next day. These data should be recorded in the Predicted Values tables shown on the next page. This assessment should be revised at 1600 to reflect the afternoon weather forecast. The 1600 forecast will determine the staffing class for the next day through the FIREFAMILY PLUS Fire Danger Calculator.

Between 1400 and the close of business, the FMO will prepare a fire behavior prediction using the existing data from the fire weather forecast to estimate fuel moistures and fire behavior using the following set of tables and the BEHAVE program. FIRE1 does DIRECT and SPOT, while FIRE2 does fuel moisture and IGNITE. The general safety message in an ICS-202 should include the range of expected fire behaviors from the outputs from the DIRECT module. The six minutes of safety topic for the day should be identified in the safety message section of the 202. This is the end of the planning for the next day.

At approximately 9 AM, the weather forecast should be available. The fire weather forecast is available from http://www.wrh.noaa.gov/spokane/fire.htm. The clerk should insert both the Synopsis and the basin description into the weather section of the 202. The FMO should consider updating the BEHAVE runs based upon a comparison of the previous forecast with the current forecast. Update, print and distribute the 202 to fire personnel.

At 1000, a daily briefing should cover the 202, an overview of the Pacific Northwest fire situation as well as the National fire situation (both the PNW and National fire situation is available from http://www.or.blm.gov/nwcc and using the decision support page to get the PM Sit Report, the AM Sit Report, the AM Shared Resources Brief, and the National Situation Report). Yesterday's prediction for today's staffing class should be noted so that personnel can prepare for extended hours, if necessary. Use the following briefing outline.

A. Current Fire Situation
    1. National Report
    2. Pacific Northwest Report
    3. Central Washington Report
B. Zone activities

C. Safety message
D. Weather forecast
E. Fire behavior information
F. Fire Danger Status and prediction
G. Firefighting resource availability (see item 18 in Field Update form).

At 1400, the weather observation for the day will be used to determine the staffing class for the remainder of the day. These data should be entered into the Observed Values tables shown on the next page. The staffing class value, along with the weather forecast will determine the need for extended coverage based upon the Step-up Plan.

Upon receipt of a fire or smoke report, follow these steps.

1. Determine fire location. If fire is on, or is threatening (usually restricted to burning within a mile of the boundary), FWS land.
    a. Fill out the Report of Fire Occurrence form.
    b. Implement Dispatch card for FMU threatened
    c. If action is successful.
        i. Fill out fire report.
        ii. Review fire.
    d. If action not successful
        i. Complete Wildland Fire Situation Analysis.
        ii. Implement Selected Alternative and return to 1.c. Is action successful?
2. If fire is on FWS land but threatening adjacent landowners, initiate a Unified Command.
3. If fire is on another jurisdictional agency, notify them and be available for assistance.

Notification

a. Notify the following personnel using the fire contact list (Appendix A). Contact the fire crew personnel by reaching one of the fire leaders (Supervisory Technician, Lead Technician, or Engine Foremen) who will then contact and muster the engines for response. As soon as possible, notify both the FMO and the Project Leader about the ignition.

1400 OBSERVED VALUES

Station ID	Date	Model	Slope Class
435102		T	1

Temp.	Wind	SOW	1 Hr. FMC	10 Hr. FMC	Herb. FMC	Wdy. FMC	Burning Index	Staffing Class

Station ID	Date	Model	Slope Class
435102		A	1

Temp.	Wind	SOW	1 Hr. FMC	10 Hr. FMC	Herb. FMC	Wdy. FMC	Burning Index	Staffing Class
				XXX		XXX		

PREDICTED VALUES

Station ID	Date	Model	Slope Class
435102		T	1

Fore-casted Temp.	Fore-casted Wind	Fore-casted SOW	Ob-served 1 Hr. FMC	Ob-served 10 Hr. FMC	Ob-served Herb. FMC	Ob-served Wdy. FMC	Pre-dicted Burning Index	Pre-dicted Staffing Class

Station ID	Date	Model	Slope Class
435102		A	1

Fore-casted Temp.	Fore-casted Wind	Fore-casted SOW	Ob-served 1 Hr. FMC	Ob-served 10 Hr. FMC	Ob-served Herb. FMC	Ob-served Wdy. FMC	Pre-dicted Burning Index	Pre-dicted Staffing Class
				XXX		XXX		
				XXX		XXX		

Fine Dead Fuel Moisture Calculation

Projection Point Time	0900	1200	1600	2000
INPUTS				
Dry Bulb Temperature				
Relative Humidity (%)				
Month				
OUTPUTS				
Reference Fuel Moisture				
Fuel Moisture Correction				
Fine Dead Fuel Moisture Content				

DIRECT Module

Projection Point Time	0900	1200	1600	2000
INPUTS				
Fuel Model				
Fine Dead Fuel Moisture Content - (FMC)				
10 Hour FMC (Add 1% to Fine FMC)				
100 Hour FMC (Add 2% to Fine FMC)				
Live FMC				
Mid-Flame Wind Speed (mph)				
Slope (%)				
OUTPUTS				
Rate of Spread (chains/hour)				
Flame Length (feet)				

DIRECT Linked to SPOT Module

Projection Point Time	0900	1200	1600	2000
INPUTS				
Mean Cover Height in Feet				
Elevation Difference				
Ridge to valley horizontal dist.				
OUTPUTS				
Spotting Distance in miles				

DIRECT Linked to SIZE Module

Projection Point Time	0900	1200	1600	2000
INPUTS				
Elapsed time	**1 Hour**	**1 Hour**	**1 Hour**	**1 Hour**
OUTPUTS				
Area in acres				
Perimeter in chains				
Length-to-width ratio				

IGNITE Module

Projection Point Time	0900	1200	1600	2000
INPUTS				
Dry Bulb Temperature				
Fine Dead FMC				
Shade				
OUTPUTS				
Probability of Ignition				

Initial Attack. While the resources are en route to the fire, relay the fire weather forecast, expected fire behavior, adjacent resource availability, and current weather conditions. A radio log or a unit log (ICS 214) should be initiated.

Step 1: Determine an initial attack plan immediately upon arrival at the fire. This should be done quickly and be based on your initial size-up of the fire. The intent is to get work started in suppressing the fire as soon as possible. Determine:

- Locations of escape routes and safety zones.
- Special hazards such as burning snags, power lines, etc.
- Good anchor points such as roads, burned area, etc.
- Where to attack the fire, i.e. at the head, flanks or rear.
- How to attack the fire, i.e., direct or indirect.
- Type of control line needed.
- Are there existing barriers that can be used?
- When will the next units arrive?
- Additional resource needs.
- How will topography affect the fire behavior?
- Locate and preserve the point of origin.

Step 2: Brief the crew and begin work. Make sure crew understands their work assignment. PROMPT DECISIVE ACTION DURING THE EARLY STAGES OF A FIRE OFTEN DETERMINES THE SUCCESS OR FAILURE OF THE INITIAL ATTACK.

When safe, begin the attack at the head of the fire to quickly stop the spread. Remember that Watch Out Situation #10 is, "You are attempting frontal assault on the fire." Establish anchored control lines. Exceptions to attacking the head:

- Fire intensity is such that work at the head of the fire is unsafe.
- Fire is burning toward a natural barrier that will check the spread. A high value resource must be protected along another portion of the fire perimeter.
- The fire is likely to burn into volatile fuels along another area of the fire perimeter that will result in an increased rate of spread.

Step 3: After resources have been deployed and control action started, continue assessment of the fire, and gather information for determining fire cause. Consider the following:

- Safety - watch for danger areas and evaluate escape routes.
- Size of the fire.
- Length of the fire perimeter.
- Location of the head.
- Values to be protected ahead of the fire.
- Current and expected weather.
- Fire behavior - as expected?
- Fire intensity and rate of spread.
- Fuel type - at location and prozimity.
- Topography.
- Time of day.

Step 4: Review the following checklist and take action to correct IMMEDIATELY if the answer to any question is "NO".

- Do you have current fire weather forecast for the fire location?
- Is the observed fire weather consistent with the forecast?
- Can you control the fire with the resources available (on the incident, as well as those en route) under expected conditions?
- Have you developed a plan to attack the fire? (Direct vs. indirect. Anchor points, escape routes, head or flank attack, priority areas).
- Have you communicated the plan to all personnel assigned to the incident, including new arrivals?
- Lookouts in place, or you can see all of the fire area?
- Can you communicate with everyone on the fire and with dispatch?
- Escape routes and safety zones are established. If you are using the black, is it completely burned and without a reburn potential?
- Safety and the standard fire orders are being followed?
- Have you reported the status of the fire to dispatch?
- Will you control the fire before the next operational period?
- Do you have a complete list of what resources have been ordered for the fire?
- If the fire will not be controlled before the next operational period, or the size of the organization exceeds the IC's capability to manage, have you informed agency headquarters?

After the resources arrive at the fire, a field report should be requested. The IA Incident Commander (IC) (IAIC) should follow Chapter 1 of the Fire Line Handbook (FLH), which covers IA with details about duties and responsibilities, checklists, and general descriptions of both strategy and tactic. Many fires at the Monument require a Type 3 Incident commander (IC) during the initial attack phase because of the number of resources responding. After forming an initial response, the IAIC should report progress. Both the IAIC and management should be assessing the possibility that the fire will transition to a higher complexity using the following list:

1. The IAIC requests additional resources.
2. Fire will not be contained by the beginning of the second full operational period.
3. Fire activity has required a change in strategy or tactics.
4. The IAIC request an Extended Attack IC.
5. Or, the project leader wants a more experienced IC.

During the transition period, the IAIC, FMO and PL have a number of responsibilities. The IAIC should do the following tasks:

1. Continue actions including shift planning, resource ordering, and assignment of resources.
2. Prepare the IC briefing.
3. Establish, in conjunction with office personnel, a check-in procedure for incoming resources.

The FMO should complete the following tasks during the transition period:

1. Prepare a complexity analysis.
2. Recommend an IC.
3. Initiate a Wildland Fire Situation Analysis (WFSA) that the PL will complete.
4. Establish an expanded dispatch operation.

5. Prepare an Incident Management Team (IMT) briefing package.

The PL should complete the following tasks during the transition period:

1. Based upon the FMO recommendation, select and order an IC.
2. Based upon the WFSA initiated by the FMO, complete and approve the WFSA.
3. Prepare a Delegation of Authority, which would include assigning a Resource Advisor and establish a procurement protocol for the IMT.
4. Consider using a Unified Command and convening a Multi-Agency Coordination (MAC) group.
5. Approve an Incident Command Post (ICP) location.
6. Negotiate supplemental agreements, as necessary.
7. Prepare and deliver an Agency Administrator's briefing.

REPORT OF FIRE OCCURRENCE

1. Name of reporting individual : _____
   Telephone: (___)_____
2. Describe location of fire: _____
   _____
3. What is the best access to fire?: _____
   _____
4. Who is the landowner?: _____
5. Whose jurisdiction?: _____
6. Approximate size of fire?: _____
7. Fuel type (grass, brush)?: _____
8. Describe the fire spread (running, creeping, smoldering, etc.): _____
9. Color of smoke (black, gray, brown, white, etc.)?: _____
10. Cause of fire?: _____
11. What is in fire's path?: _____

Today's weather forecast is:

Today's Staffing Class is:

Today's Fire Behavior prediction is: ROS _____ FL _____

Current Weather Conditions:

Location	**Wind Direction**	**Wind Speed**	**Temperature**	**R.H.**
Hanford				
Columbia NWR				
Umatilla NWR				

ALE/McGee-Riverlands

The ALE/McGee-Riverlands FMU is 86,000 acres in size. The dispatch card for a solitary incident in this unit is as follows:

RESOURCE	Staffing class 1	Staffing class 2	Staffing class 3	Staffing class 4	Staffing class 5
Incident Commander	Type 4	Type 4	Type 3	Type 3	Type 3
Engine *	1	2	5	8	8
Water Tender *			2	3	3
Consider requesting an Air Tanker				1	2
Consider requesting a Helicopter				1	2

*if available. Use closest resource with a preference to FWS and Hanford resources.

The ALE unit has ten sub-units based on existing roads that would facilitate fire control. Plants that grow near the ridgetop are unique to the site. The Rattlesnake Springs area has cultural values. The use of heavy equipment is restricted in the Rattlesnake Springs area. Except on existing roads, the use of any equipment (including light engines) within 1/4 mile of the escarpment edge of the Umtanum Ridge is prohibited because of surface instability and potential for sloughing at the escarpment. Protection of sensitive resources is an objective unless achieving this objective jeopardizes firefighter safety.

Saddle Mountain

This unit consists of 30,000 acres of the original Saddle Mountain National Wildlife Refuge plus 57,000 acres of the former Wahluke Slope Wildlife Management Area land both north and south of State Road 24 in Adams, Franklin and Grant Counties. The dispatch card for a solitary incident in this unit is as follows:

RESOURCE	Staffing class 1	Staffing class 2	Staffing class 3	Staffing class 4	Staffing class 5
Incident Commander	Type 4	Type 4	Type 3	Type 3	Type 3
Type 6 Engine *	1	2	4	6	6
Type 5 Engine *		1	1	2	2
Water Tender *			1	1	2
Consider requesting an Air Tanker				1	2
Consider requesting a Helicopter				1	2

*if available. Use closest resource.

The vast Saddle Mountain unit, approximately 90,000 acres, has sixteen sub-units demarcated by roads. The parts of this unit that is in Franklin county receives no protection from the rural fire district. Except on existing roads, the use of any equipment (including light engines) within 1/4 mile of the escarpment edge of the White Bluffs is prohibited because of surface instability and potential for sloughing at the

escarpment. Activities within 200 yards of the Columbia River banks may encounter archeological artifacts. Except on existing roads, no equipment can be within 200 yards of the Columbia River. Suppression activities within 200 yards of the river are restricted to the use of water and flappers except as directed by the PL. Protection of sensitive resources is an objective unless achieving this objective jeopardizes firefighter safety.

Ringold Unit

This unit is the former Wahluke Slope Wildlife Management Area in Franklin County. This remote area of the Monument is outside the district boundaries of cooperators. Additional support would require a supplemental agreement with Franklin County 4 in Basin City. The dispatch card for a solitary incident in this unit is as follows:

RESOURCE	Staffing class 1	Staffing class 2	Staffing class 3	Staffing class 4	Staffing class 5
Incident Commander	Type 4	Type 4	Type 3	Type 3	Type 3
Engine (USFWS)*	1	2	3	4	4
Water Tender *			1	1	2
Consider requesting an Air Tanker				1	2
Consider requesting a Helicopter				1	2

*if available. Use closest resource.

Activities within 200 yards of the Columbia River banks may encounter archeological artifacts. Except on existing roads, no equipment can be within 200 yards of the Columbia River. Suppression activities within 200 yards of the river are restricted to the use of water and flappers except as directed by the PL. The use of any equipment (including light engines) within 1/4 mile of the escarpment edge of the White Bluffs is prohibited because of surface instability and potential for sloughing at the escarpment. Protection of sensitive resources is an objective unless achieving this objective jeopardizes firefighter safety.

FIELD UPDATE

1. Fire Name? _____ 2. Incident Commander?_____

3. Actual Location? Township?_____ Range? _____ Section? _____

GPS Coordinates? Latitude ____:____:____ Longitude _____:____:_____

4. Whose Land Threatened? _____

5. Possible Cause? (See List)

01___ Lightning	11___ Trash Burning	21___ Insect/Snake Control
02___ Aircraft	12___ Burning Dump	22___ Job Hunting
03___ Burning Vehicle	13___ Field Burning	23___ Blasting
04___ Exhaust-Power Saw	14___ Land Clearing	24___ Burning Building
05___ Exhaust-Other	15___ Slash Burning	25___ Power Line
06___ Logging Line	16___ Right-of-Way Burning	26___ Fireworks
07___ Brakeshoe	17___ Resource Mgmt. Burn	27___ Playing With Matches
08___ Cooking Fire	18___ Grudge Fire	28___ Repelling Predators
09___ Warming Fire	19___ Pyromania	29___ House/Stove Flue

10___ Smoking 20___ Smoking Out Animals 30___ Other

6. What Is The Access To Fire? _____

7. Type Of Fuel Burning? _____ , & In What Condition? _____
(Grass, Brush, Etc.) (Cured, Green, Etc.)

8. Where On Slope Did Fire Start? _____ 9. Size Of Fire? _____
(Bottom, Mid, Ridgetop)

10. Current Character of Fire? (See List)
___ Smoldering ___Running ___Torching ___ Crowning/Spotting
___ Creeping ___ Running/Spotting ___ Crowning ___ Erratic

11. Anticipated Control Problems? _____ 12. Fire Potential? _____

13. Are There Values Threatened? (Private Property, Improvements, Public Safety, Firefighter Safety, Public Concern.) _____

14. Estimated Containment Time? _____ 15. Estimated Control Time? _____

16. Weather Conditions							
Location	Elev	Obs Time	Wind Dir/Speed	Dry Bulb	Wet Bulb	Rel Hum	Remarks (Tstrm, etc.)

17. Resources On The Scene? _____

_____

_____

_____

18. Additional Resource Needs (Enter the Number Needed)?

_____ Helicopter	_____ Airtanker-Large	_____ Airtanker-Single-Engine
_____ Lead Plane	_____ Smokejumper Load	_____ Air Tactical Aircraft
_____ Type 1 Crew	_____ Type 2 Crew	_____ Type 3 Engine
_____ Type 4 Engine	_____ Type 5 Engine	_____ Type 6 Engine
_____ Type 7 Engine	_____ Dozer	_____ Resource Advisor

_____ OTHER: _____

19. Special Positions Needed? _____

20. Hazards In Area? _____

21. What Are Incident Objectives? _____

_____

_____ _____

(Signature & Title) (Date)

LOCAL INCIDENT COMMANDER BRIEFING

IC/General Staff

- Incident map
- Time of ignition
- Point of origin
- Fuels (type, loading, and moisture)
- Weather (current and predicted)
- Topography
- Fire behavior concerns
- Local hazards
- Review of existing control plan
- A copy of the current Incident Action Plan (IAP)
- Identification of any agency-specific resources currently assigned to the incident

Operations

- Safety
- Current strategy
- Tactics
- Aircraft use and availability
- Hand crew operations
- Equipment operations
- Engine operations (including city, county, and rural cooperators)
- Helibase/helispot locations on a map
- Helibase crash fire protection
- Smoke conditions
- Effects on aircraft, vehicle traffic, observation
- Responsibilities for initial attack

Planning

- Resources currently available
- Resources already ordered
- Availability of aerial photos, usable maps
- Infrared requests
- Water availability
- Weather forecasting resources

Logistics

- ICP and Base/Camp sites
- Access routes to the fireline
- Communication resources
- Communications plan available
- Medical plan available
- Known security problems
- Feeding facilities available
- Transportation resources available
- Traffic plan available
- Hazardous material management

Finance/Administration

- Status of rental agreements (private contractors, fire service organizations)
- Status of cost share agreements
- Status of current and anticipated claims
- Status of payroll function and time reports
- Cost to date

AGENCY ADMINISTRATOR BRIEFING

This briefing should take place as soon as the incoming team is completely assembled. The agency administrator (or designated representative) should provide, at a minimum, the following information to the team:

- A written overview with the following information:
  - Name and number of incident.
  - Approximate size, location, jurisdictions and land status.
  - Name of the current incident commander.
  - General weather conditions at the incident site.
  - Behavior of fire.
  - Fuel types.
  - Current tactics.
  - Incident command post and base locations.
  - Other strategies, resources and tactics which might have an impact on the incident.

- Signed delegation of authority to the incoming incident commander.
- Local participation in the team organization by resource and agency representatives.
- Information about existing or anticipated unified command organization (if any). (May have been a consideration in decision to order a team.)
- Names and skills of technical specialists assigned to the incident.
- Unit fire policy.
- Concerns about resource values, improvements, wilderness and roadless areas, cultural resources, rare and endangered species, rehabilitation requirements, etc.
- Priorities for control.
- News media procedures.
- Political considerations.
- Agreements in effect.
- Other agencies already on the incident, agency representatives.
- Desired date and time when team transition will occur.

- Safety issues:
  - Accidents to date.
    - Status of accident reports.
    - Areas with existing or potential hazardous materials.
    - Investigation of ignition point and direction on needed follow-up.
    - Hazards (power lines, underground gas lines, etc.)
    - Name of local and state safety manager

- Operations and Planning (Considered in incident commander briefing):
    - Strategy
    - Tactics
    - Local unusual fire behavior and fire history in the vicinity of the incident.
    - Pre-attack plans available to the team.

- ♦ Incident Status Summary (ICS-209) reporting requirements.
- ♦ Copy of the current ICS-209.
- ♦ Status of current team.
- ♦ Status of local agency personnel.
- ♦ Agency capabilities for team operation support.
- ♦ Agency rest and rotation policies.
- ♦ Agency rehabilitation policies.
- ♦ Agency demobilization concerns.
- ♦ Other large incidents

- Logistics:
  - ♦ Transportation routes.
  - ♦ Ordering system to be used.
  - ♦ Procurement unit in place or ordered.
  - ♦ Incident feeding procedures.
  - ♦ Available sleeping facilities.
  - ♦ Local medical facilities.
  - ♦ Nearest burn treatment center.
  - ♦ Contacts with local law enforcement agencies.

- Finance/Administration:
  - ♦ Fiscal limitations and constraints.
  - ♦ Any cost-sharing arrangements affecting the incident.
  - ♦ Contracting officer assigned.
  - ♦ Potential for claims.
  - ♦ Comptroller assigned.

DELEGATION OF AUTHORITY

Hanford Reach National Monument
Arid Lands Ecology Reserve Unit
Richland , Washington

As of XXXX on Xxx XX, 2001, I have delegated authority to manage the X fire (13702-9261-xxxx) on the Fitzner-Eberhardt Arid Lands Ecology Reserve to Incident Commander X and his Management Team.

As Incident Commander, you are accountable to me for the overall management of this incident including its control and return to local forces. I expect you to adhere to relevant and applicable laws, policies and professional standards. While suppression of the fire is your primary task, you are expected to do so in a manner that provides for the safety and well being of personnel involved. Consideration for the needs of local residents and communities is essential for successful management of the incident. I expect daily breifings as shift plans are developed.

I am assigning John Doe, Staff Member as the line officer representative to act as liaison and provide any help you need. He is authorized to speak for me in the event a decision is needed.

Request Federal forces as soon as possible to reduce cost to the USFWS as well as to release resources to local fire protection district duties.

The fire, which ignited on Xxx XX, XXXX is burning in the X area of the Arid Lands Ecology Reserve. My concerns for managing this fire are:

1.Provide for firefighter and public safety.
2.Use existing roadways, previous fire breaks, and natural barriers to contain the fire.
3.Minimize burned acreage of shrub-steppe habitat.
4.Minimize use of ground disturbing equipment using a minimum impact suppression tactic.
5.Do not disturb sensitive plant populations.
6.Do not disturb known archeological sites.
7.Prevent the spread of fire onto adjacent landowner's property from their property.
8.Protect private and refuge property to the extent possible.
9.Manage the fire cost commensurate with the values at risk.
10.Provide training opportunities for USFWS personnel, as requested.

APPENDIX F: ESR TEMPLATE

YYYYY Fire
BURNED AREA EMERGENCY STABILIZATION AND REHABILITATION (ESR) PLAN

AGENCY/UNIT: XXXXX National Wildlife Refuge

LOCATION: *City, County, State*

DATE: *Date Prepared*

PREPARED BY: *Individual, formal team, or ad hoc team*

Submitted By: _____ Date: _____
Title (i.e., Burned Area Emergency Stabilization and Rehabilitation Team Leader.)

TABLE OF CONTENTS

Insert Here

SUMMARY OF RECOMMENDATIONS

Introduction

This plan has been prepared in accordance with FWS Service Manual 095 FW 3.9. This plan provides burned area emergency stabilization and rehabilitation (ESR) recommendations for all lands burned within the YYYYY Fire perimeter and downstream impact areas including: public lands administered by the U.S. Fish & Wildlife Service (FWS) *and other jurisdiction if necessary*. The primary objectives of the YYYYY Fire Burned Area Emergency Stabilization and Rehabilitation (ESR) Plan are:

Emergency Stabilization

- To prescribe cost effective post-fire stabilization measures necessary to protect human life, property, and critical cultural and natural resources.
- To promptly stabilize and prevent further degradation to affected resources on lands within the fire perimeter or downstream impact areas and mitigate damages caused by fire suppression operations in accordance with approved refuge management plans and policies, and all relevant federal, state, and local laws and regulations.

Rehabilitation

- To repair or improve lands unlikely to recover naturally from severe wildland fire damage by emulating historic or pre-fire ecosystem structure, function, diversity, and dynamics according to approved refuge management plans.
- Restore or establish healthy, stable ecosystems, even if these ecosystems cannot fully emulate historic or pre-fire conditions as specified in approved refuge management plans.

This plan addresses emergency stabilization and rehabilitation of fire suppression and fire damages. *Summarize who did what. Such as: The burned area emergency stabilization and rehabilitation team (ESR) Team conducted an analysis of fire damages throughout the lands impacted by the fire. The watershed assessment group assessed the overall watershed changes caused by the fire and developed a burn severity map. Archeologists inventoried suppression impacts for potential damage to cultural sites as well as initiating a cultural resource damage assessment. The vegetation specialist evaluated and assessed fire damages and suppression impacts to vegetative resources, including threatened and endangered (T&E) species, and identified values at risk associated with vegetative losses. The wildlife biologist conducted an assessment of T&E species and initiated and closed Section 7 consultations with U.S. Fish & Wildlife Service. The GIS specialists gathered the data layers necessary for the plan, coordinated GPS activities. The operations specialists inventoried fire suppression impacts, developed specifications for their rehabilitation and initiated repair of fence cuts.*

Individual resource fire damage assessments produced by these specialists are in Appendix I.. The individual treatments specifications including the effectiveness monitoring identified in the assessments can be found in Part F. A summary of the costs by jurisdictions is in Part E. Appendix II contains the National Environmental Policy Act (NEPA) compliance documentation summary. Appendix III contains the ESR Plan maps. Appendix IV contains photo documentation. Appendix V contains supporting documentation.

Fire Background

Provide a summary of the fire.

- *When and how it started.*
- *A chronological summary of fire and fire management organization growth.*
- *Issues to be addressed in the ESR Plan*

Fire Damages and Threats to Human Safety and Natural and Cultural Resources

Discuss the damages caused by suppression activities and the fire. List the recommended fire suppression activity damage, emergency stabilization, and rehabilitation treatments recommended in the plan. Summarize the individual resource fire damage assessments.

XXXXX National Wildlife Refuge Management Requirements

Provide basic refuge information and issues that will affect Burned Area Emergency Stabilization and Rehabilitation.

Emergency Stabilization

Identify issues and concerns (hazardous environments, wilderness designation, cultural resource restrictions, water quality requirements, etc.) that will impact refuge objective achievement as discussed in approved refuge management plans that are pertinent to emergency stabilization actions under consideration.

Rehabilitation

The following statements in approved XXXXX National Wildlife Refuge management plans justify the proposed burned area rehabilitation treatments funded with Emergency Rehabilitation funds.

Quote (include page number, approving officials name, and date approved for review and auditing purposes) pertinent passages from approved refuge management plans (i.e., Comprehensive Conservation Plan, Master Plan, Habitat Management Plan, Grazing Management Plan, Marsh and Water Management Plan, etc.) that justify the proposed rehabilitation activities. Such as:

- *"Restore riparian areas invaded by salt cedar to historic Southwestern Willow Flycatcher habitat" (Lower Colorado River Refuge Complex Comprehensive Conservation Plan, page 31, Cathy Smith, October 2, 1997).*
- *"Rehabilitate longleaf-wiregrass communities degraded by past forest practices" (St. Marks NWR Habitat Management Plan, page 56, John Doe, February 29, 2001).*

PART A - FIRE LOCATION AND BACKGROUND INFORMATION

Fire Name	YYYYY
Fire Number	
Agency Unit	
Region	
State	
County(s)	
Ignition Date/Cause	
Zone	
Date Controlled	
Jurisdiction	Acres
FWS - XXXXX NWR	
other jurisdictions	
other jurisdictions	
other jurisdictions	
other jurisdictions	
other jurisdictions	
Total Acres	
Date Contained	

PART B - NATURE OF PLAN

I. Type of Plan (check one box below)

	Emergency Stabilization
	Rehabilitation
	Both Emergency Stabilization and Rehabilitation

II. Type of Action (check one box below)

	Initial Submission
	Updating or Revising the Initial Submission
	Supplying Information of Accomplishment to Date on Work
	Final Accomplishment Report (To Comply with the Closure of the 9262 Account)

PART C - EMERGENCY STABILIZATION AND REHABILITATION ASSESSMENT

I. Emergency Stabilization Objectives

A. *Locate and stabilize severely burned slopes which pose a direct threat to human life, property or critically important cultural and/or natural resources.*
B. *As practical and necessary, restore natural conditions to areas disturbed by fire suppression actions.*
C. *Prevent the establishment of non-native invasive plants.*
D. *Prevent degradation of unburned areas within the fire perimeter before spring greenup by wild ungulates and horses.*
E. *Etc.*
F. *Etc.*

II. Rehabilitation Objectives

A. *Rehabilitate former salt-cedar areas with willows, cottonwoods, and other native species as specified in the refuge's approved Comprehensive Conservation and Habitat Management Plan.*
B. *Rehabilitate burned grazing program infrastructure (i.e., boundary and allotment management fences and water troughs).*
C. Repair or replace burned facilities in the Coot Creek campground.
D. *Etc.*
E. *Etc.*

PART D - TEAM ORGANIZATION, MEMBERS, AND RESOURCE ADVISORS

I. Burned Area Emergency Stabilization and Rehabilitation (ESR)Team Members: *(List of technical specialists used to develop the plan)*

Position	Team Member (Agency)
Team Leader	*Cathy Smith (NPS)*
Public Information	
Operations	
NEPA Compliance & Planning	
Hydrologist	
Soil Scientist	
Geologist	
Cultural Resources/Archeologist	
Vegetation Specialist	
Wildlife Biologist	
GIS Specialist	
Documentation/Computer Specialist	
Photographer	
Other Technical Specialists	

II. Resource Advisors: (Note: Resource Advisors are individuals who assisted the ESR Team with the preparation of the plan. See Part H for a full list of agencies and individuals who were consulted or otherwise contributed to the development of the plan.

Name	Affiliation
Jane Doe	*XXXXX NWR, Project Leader*

PART E - SUMMARY OF ACTIVITIES AND COSTS

The summary of activities and cost table below identifies emergency stabilization and rehabilitation costs charged or proposed for funding from Suppression Operations, Emergency Rehabilitation, agency operation, and other funding sources. Expenditures are displayed in the total cost column. They are coded with the appropriate cost authority. The total cost of the rehabilitation effort to date, excluding the costs absorbed by the fire account (fire crews, labor, and associated overhead) is displayed as either Suppression Operations (**9261**), Emergency Rehabilitation (**9262**), or Agency Operations (**1261**) or other.

Fire Name: YYYYY

As of *date*

Specification Cost Summary

Account	Dollars	Dollars
Fire Suppression Damage Rehabilitation (9261)		
Emergency Rehabilitation (9262)		$0
Emergency Stabilization	$	
Rehabilitation	$	
Agency Operations (1261)		
Other Accounts		
Funding Summary - Estimated Total		$0

PART E - SUMMARY OF EMERGENCY STABILIZATION ACTIVITIES - COST SUMMARY TABLE - YYYYY Fire

Spec #	Title	Unit	Unit Cost	# of Units	Cost by Funding Source				Implementation Method	Specification Total
					9261	9262	1261	Other		
N-3b	*Soil Stabilization*	*Acre*	*$ 264.85*	*200*		*$ 52,970*			*P,C*	*$ 52,970*

Spec #	Title	Unit	Unit Cost	# of Units	Cost by Funding Source				Implementation Method	Specification Total
					9261	9262	1261	Other		
TOTAL COST					$ 0	$ 52,970	$ 0	$ 0		$ 52,970

COST: 9261=Suppression Operations, 9262=Emergency Rehabilitation, 1261=Agency Operations Funding, Other **METHOD**: FC=Crew Assigned to Fire, C=Contract, EFC=Emergency Fire Contract, P=Agency Personnel

PART E - SUMMARY OF REHABILITATION ACTIVITIES - COST SUMMARY TABLE - YYYYY Fire

Spec #	Title	Unit	Unit Cost	# of Units	Cost by Funding Source			Implementation Method	Specification Total
					9262	1261	Other		
N-3b	*Sagebrush Planting*	*Acre*	*$ 264.85*	*200*	*$ 52,970*			*P,C*	*$ 52,970*

Spec #	Title	Unit	Unit Cost	# of Units	Cost by Funding Source			Implementation Method	Specification Total
					9262	1261	Other		
TOTAL COST					$ 52,970	$ 0	$ 0		$ 52,970

COST: 9261=Suppression Operations, 9262=Emergency Rehabilitation, 1261=Agency Operations Funding, Other **METHOD**: FC=Crew Assigned to Fire, C=Contract, EFC=Emergency Fire Contract, P=Agency Personnel

PART F - SPECIFICATIONS

SPECIFICATION TITLE:		**AGENCY:**	
PART E LINE ITEM:		**FISCAL YEAR(S) (list each year):**	

I. WORK TO BE DONE (describe or attach exact specifications of work to be done):

Number and Describe Each Task:

A. General Description:

B. Location/(Suitable) Sites:

C. Design/Construction Specifications:

I.

2.

II. Purpose of Treatment Specifications:

II. LABOR, MATERIALS AND OTHER COST:

▸ **PERSONNEL SERVICES: (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item):** **Do not include contract personnel costs here (see contractor services below).**	**COST/ITEM**
TOTAL PERSONNEL SERVICE COST	

▸ **EQUIPMENT PURCHASE, LEASE AND/OR RENT (Item @ Cost/Hour X # of Hours X #Fiscal Years = Cost/Item): Note: Purchases require written justification that demonstrates cost benefits over leasing or renting.**	**COST/ITEM**
TOTAL EQUIPMENT PURCHASE, LEASE OR RENTAL COST	

▶ **MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X #Fiscal Years = Cost/Item):**	**COST/ITEM**
TOTAL MATERIALS AND SUPPLY COST	

▶ **TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X #Fiscal Years = Cost/Item):**	**COST/ITEM**
TOTAL TRAVEL COST	

▶ **CONTRACT COST (Labor or Equipment @ Cost/Hour X #Hours X #Fiscal Years = Cost/Item):**	**COST/ITEM**
TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNITS COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1						
FY 2						
FY 3						
TOTAL						

FUNDING SOURCE
9261 - Suppression Operations
9262 - Emergency Rehabilitation
1261 - Agency Operations
Other

METHODS
P - Agency Personnel Services
C - Contract (long-term)
EFC - Emergency Fire Contract (short-term)
FC - Incident Management Crew Assignment

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies	
4. Estimates based upon government wage rates and material cost.	
5. No cost estimate required - cost charged to Fire Suppression Account	

P = Personnel Services, **E** = Equipment **M** = Materials/Supplies, **T** = Travel, **C** = Contract, **F** = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within ESR Plan Accomplishment Report:

PART G - POST-REHABILITATION REQUIREMENT[1]

The following are post-rehabilitation, implementation, operation, maintenance, monitoring, and evaluation actions beyond three years to ensure the effectiveness of initial investments. Estimated annual cost and funding source is indicated.

I. Emergency Stabilization

A. *Monitor and maintain road culverts clear of debris ($5,000 - 1261)*
B. *Monitor ($1,000) and dredge ($75,000 - 1261) sediment ponds as need*
C. *Continue invasive species monitoring and control ($50,000 - 1261)*
D. *Etc.*
E. *Etc.*
F. *Etc.*

II. Rehabilitation

A. Monitor and maintain drip irrigation system ($25,000 - 1261)
B. *Long-term Monitoring*
   1. Monitor riparian vegetation recovery ($10,000 - 1261)
   2. Complete refuge cultural resources systematic survey ($75,000 - 1261)
   3. Southwestern willow flycatcher population monitoring ($25,000 - 1261)
C. *Etc.*
D. *Etc.*
E. *Etc.*

[1] Non-9262 funding

PART H - CONSULTATIONS

U.S. Fish and Wildlife Service
Jane Doe, Regional Archeologist

National Marine Fisheries Service
John Doe, Anadromous Fish Biologist

Umatilla Tribe
Jane J. Doe, Tribal Council Member

Etc., etc., etc.

PART I - REVIEW AND APPROVAL

U.S. Fish and Wildlife Service, XXXXX National Wildlife Service

I. Suppression Operations (9261) Funding Approval (check one box below):

☐ Approved

☐ Approved with Revision (see attached)

☐ Disapproved

Project Leader, XXXXX National Wildlife Refuge Date

II. Emergency Rehabilitation (9262) Funding Approval (check one box below):

☐ Approved

☐ Approved with Revision (see attached)

☐ Disapproved

Regional Director, Region *X* Date

Regional Fire Management Coordinator concurrence that the plan fits the technical definition for use of Emergency Rehabilitation finding.

Regional Fire Management Coordinator, Region *X* Date

III. Agency Operational Base (1261) Funding Approval (check one box below):

☐ Approved

☐ Approved with Revision (see attached)

☐ Disapproved

Regional Director, Region *X* Date

III. Emergency Rehabilitation (9262) Funding Approval (check one box below):

☐ Approved

☐ Approved with Revision (see attached)

☐ Disapproved

Chief, National Wildlife Refuge System, Washington, D.C. Date

APPENDIX I: ESR FIRE DAMAGE ASSESSMENT REPORTS

- *Soil & Watershed Resource Damage Assessment*
- *Vegetation Resource Damage Assessment*
- *Forest Resource Damage Assessment*
- *Wildlife Resource* Damage Assessment
- Cultural Resource Damage Assessment
- Infrastructure Resource Damage Assessment
- Operations Assessment
- ESR Team Assessment

YYYYY FIRE *RESOURCE* DAMAGE ASSESSMENT

I. Objectives
II. Issues
III. Observations
A. Background Information
B. Reconnaissance Method
C. Findings
IV. Recommendations
A. Management (specification related)
B. Specification Monitoring (specification related)
C. Management (non-specification related)
V. Consultations
VI. References

APPENDIX II - ENVIRONMENTAL COMPLIANCE

Federal, State, and Private Lands Environmental Compliance Responsibilities

All projects proposed in the YYYYY Fire Burned Area Emergency Stabilization and Rehabilitation (ESR) Plan that are prescribed, funded, or implemented by Federal agencies on Federal, State, or private lands are subject to compliance with the National Environmental Policy Act (NEPA) in accordance with the guidelines provided by the Council on Environmental Quality (CEQ) Regulations (40 CFR 1500-1508); Department of the Interior Manual, Part 516, U.S. Fish and Wildlife Service, NEPA Guidelines, Part 516 DM 6, Appendix 1; and DOE, NEPA Regulations (10 CFR Part 1021). This Appendix documents the ESR Team considerations of NEPA compliance requirements for prescribed rehabilitation and monitoring actions described in this plan for all jurisdictions affected by the 24 Command Fire burned area emergency.

Related Plans and Cumulative Impact Analysis

XXXXX National Wildlife Refuge Comprehensive Conservation Plan (*approval date*). The XXXXX National Wildlife Refuge Comprehensive Conservation Plan was reviewed and it was determined that actions proposed in the YYYYY Fire ESR Plan within the boundary of the XXXXX National Wildlife Refuge are consistent with the management objectives established in the Comprehensive Conservation Plan. The Comprehensive Conservation Plan NEPA compliance process specifically addresses:

- *List specific issues*

XXXXX National Wildlife Refuge Habitat Management Plan (*approval date*). The XXXXX National Wildlife Habitat Management Plan Plan was reviewed and it was determined that actions proposed in the YYYYY Fire ESR Plan within the boundary of the XXXXX National Wildlife Refuge are consistent with the management objectives established in the Habitat Management Plan. The Habitat Management Plan NEPA compliance process specifically addresses:

- *List specific issues*

XXXXX National Wildlife Refuge Fire Management Plan (*approval date*). The XXXXX National Wildlife Fire Management Plan Plan was reviewed and it was determined that actions proposed in the YYYYY Fire ESR Plan within the boundary of the XXXXX National Wildlife Refuge are consistent with the management objectives established in the Fire Management Plan. The Fire Management Plan NEPA compliance process specifically addresses:

- *List specific issues*

Cumulative Impact Analysis

Cumulative effects are the environmental impacts resulting from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, both Federal and non-Federal. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. The emergency protection and rehabilitation treatments for areas affected by the YYYYY Fire, as proposed in the YYYYY Fire ESR Plan, do not result in an intensity of impact (i.e. major ground disturbance, etc.) that would cumulatively constitute a significant impact on the quality of the environment. The treatments are consistent with the above jurisdictional management plans and associated environmental compliance documents and categorical exclusions listed below.

Applicable and Relevant Categorical Exclusions

U.S. Fish and Wildlife Service: The individual actions proposed in this plan for XXXXX National Wildlife Refuge are Categorically Excluded from further environmental analysis as provided for in the Department of the Interior Manual Part 516 and U.S. Fish and Wildlife Service, NEPA Guidelines, Part 516 DM 6, Appendix 1. All applicable and relevant Department and Agency Categorical Exclusions are listed below. Department exceptions (516) DM 2.3 do not apply to any of the individual actions proposed. Categorical Exclusion decisions were made with consideration given to the results of required emergency consultations completed by the ESR Team and documented below.

Applicable Department of the Interior Categorical Exclusions

- 516 DM2 App. 2,1.6. Non-destructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research and monitoring activities.
- 516 DM 6 App. 4.4 A. Operations, maintenance, and replacement of existing facilities (includes road maintenance).
- 516 DM 6 App. 4.4 L(5) Emergency road repairs under 23 U.S.C. 125.
- 516 DM 6 App. 7.4 C(3) Routine maintenance and repairs to non-historic structures, facilities, utilities, grounds and trails.
- 516 DM 6 App. 7.4 C(19) Landscaping and landscape maintenance in previously disturbed or developed areas.

Applicable U.S. Fish and Wildlife Service Categorical Exclusions

- 516 DM 6 App. 1.4B (1) Research, inventory, and information collection activities directly related to the conservation of fish and wildlife resources which involve negligible animal mortality of habitat destruction, no introduction of contaminants, or no introduction of organisms not indigenous to the affected ecosystem.
- 516 DM 6 App. 1.4B (3) i. The installation of fences.
- 516 DM 6 App. l.4B (3)iii. The planting of seeds or seedlings and other minor revegetation actions.
- 516 DM 6 App. 1.4B (3)v. The development of limited access for routine maintenance and management purposes.
- 516 DM 6 App. 1.4B (5) Fire management activities, including prevention and restoration measures, when conducted in accordance with Departmental and Service procedures.
- 516 DM 6 App. 1.4B (6) The reintroduction or supplementation (e.g. stocking) of native, formerly native, or established species into suitable habitat within their historic or established range, where no or negligible environmental disturbances are anticipated.

Statement of Compliance for the YYYYY Fire Burned Area Emergency Stabilization and Rehabilitation Plan.

This section documents consideration given to the requirements of specific environmental laws in the development of the YYYYY Fire ESR Plan. Specific consultations initiated or completed during development and implementation of this plan are also documented. The following executive orders and legislative acts have been reviewed as they apply to the YYYYY Fire ESR Plan:

- National Historic Preservation Art (NHPA).
- Executive Order ll988. Floodplain Management.
- Executive Order 11990. Protection of Wetlands.
- Executive Order 12372. Intergovernmental Review.
- Executive Order 12892. Federal Actions to Address Environmental Justice in Minority and Low-income Populations.
- Endangered Species Act.
- Secretarial Order 3127. Federal Contaminated
- Clean Water Act.
- Clean Air Act.

CONSULTATIONS

- *List partners and neighbors consulted*

NEPA Checklist: If any of the following exception applies, the ESR Plan cannot be Categorically Excluded and an Environmental Assessment (EA) is required.

(Yes) (No)

( ) ( ) Adversely affect Public Health and Safety

( ) ( ) Adversely affect historic or cultural resources, wilderness, wild and scenic rivers aquifers, prime farmlands, wetlands, floodplains, ecologically critical areas, or Natural Landmarks.

( ) ( ) Have highly controversial environmental effects.

( ) ( ) Have highly uncertain environmental effects or involve unique or unknown environmental risks.

( ) ( ) Establish a precedent resulting in significant environmental effects.

( ) ( ) Relates to other actions with individually insignificant but cumulatively significant environmental effects.

( ) ( ) Adversely effects properties listed or eligible for listing in the National Register of Historic Places

( ) ( ) Adversely affect a species listed or proposed to be listed as Threatened or Endangered.

( ) ( ) Threaten to violate any laws or requirements imposted for the "protection of the environment" such as Executive Order 1 1 988 (Floodplain Management) or Executive Order 1 1 990 (Protection of Wetlands).

National Historic Preservation Act

Ground Disturbance:

( ) None

( ) Ground disturbance did occur and an archeologist survey, required under section 110 of the NHPA will be prepared. A report will be prepared under contract as specified by the ESR Plan.

A NHPA Clearance Form:

( ) Is required because the project may have affected a site that is eligible or on the national register. The clearance form is attached. SHPO has been consulted under Section 106 (see Cultural Resource Assessment, Appendix I).

( ) Is not required because the ESR Plan has no potential to affect cultural resources (initial of cultural resource specialist).

Other Requirements

(Yes) (No)

( ) ( ) Does the ESR Plan have potential to affect any Native American uses? If so, consultation with affiliated tribes is needed.

( ) ( ) Are any toxic chemicals, including pesticides or treated wood, proposed for use? If so, local agency integrated pest management specialists must be consulted.

I have reviewed the proposals in the YYYYY Fire Burned Area Emergency Stabilization and Rehabilitation Plan in accordance with the criteria above and have determined that the proposed actions

would not involve any significant environmental effect. Therefore it is categorically excluded from further environmental (NEPA) review and documentation. ESR Team technical specialists have completed necessary coordination and consultation to insure compliance with the National Historic Preservation Act, Endangered Species Act, Clean Water Act and other Federal, State and local environment review requirements.

ESR Team Environmental Protection Specialist Date

Project Leader, XXXXX National Wildlife Refuge Date

APPENDIX III - MAPS

- *Fire Perimeter*
- *Jurisdiction Map*
- *Suppression Impacts*
- *Soils*
- *Burn Severity*
- *Vegetation Communities*
- *Vegetation Mortality*
- *Threatened and Endangered Species Areas*
- *Invasive Species*
- *Wind Erosion Risk Map*

APPENDIX IV - PHOTO DOCUMENTATION

APPENDIX V - SUPPORT DOCUMENTS

FISH AND WILDLIFE SERVICE

PRESCRIBED FIRE PROPOSAL

Hanford Reach National Monument /
Saddle Mountain National Wildlife Refuge

TEMPLATE

Prepared By:_____ Date:_____
Preparer

Approved By:_____ Date:_____
Prescribed Fire Burn Boss

Approved By:_____ Date:_____
Zone Fire Management Officer

Reviewed By:_____ Date:_____
Project Leader

The approved Annual Prescribed Fire Proposal constitutes the authority to burn pending approval of Section 7 Consultations, Environmental Assessments or other required documents. No one has the authority to burn without an approved plan or in a manner not in compliance with the approved plan. Actions taken in compliance with the approved Annual Prescribed Fire Proposal will be fully supported.

Is a Section 7 Consultation being forwarded to Fish and Wildlife Enhancement for review ? NO .

PRESCRIBED FIRE PROPOSAL

Station:

Project Number:

Fire Number:

Name of Area: **Unit No.:**

Acres To Be Burned: **Perimeter Of Burn:**

Legal Description: **County:**

Latitude: **Longitude:**

I. GENERAL DESCRIPTION OF BURN UNIT

Physical Features and Vegetation Cover Types:

Primary Resource Objectives of Unit :

1)

Burn Objectives:

1)

Acceptable Range of Results :

1)

II. PRE-BURN MONITORING

Vegetation Type	Acres	Percent composition	Fire Behavior Fuel Model
Total	0	0	

III. PLANNING AND ACTIONS

Site Preparation:

On Site

Off Site

Safety Considerations:

Only Qualified personnel will be used to implement ignition and suppression actions.

Weather Information:

Spot weather forecast information will be solicited from the National Weather Service in Spokane. Mixing height and transport wind speed will also be obtained form NWS. The weather station at Columbia NWR, as well as the Hanford Meteorological Service's weather stations at http://etd.pnl.gov:2080/HMS/ and clicking on the Real Time link, will be used to monitor conditions during the burn, on site observations may be collected as well.

Informational Contacts:

Communication and Coordination on the Burn:

The Mid-Columbia Basin Fire Management Zone has established a standard Communications plan for fire use. This plan identifies standard crew tactical and command frequencies. Below is a summary of the radio frequencies.

Function	Channel	Name	Transmit frequency	Receive Frequency	Channel Guard
Command	2	USFWS Local	164.775	164.775	110.9
Crew Tactical	3	Red Net	153.830	153.830	

- ✧ The Burn Boss will have a cell phone which will allow an additional method of communications and will allow the Burn Boss to contact other agencies or persons that are not monitoring project frequencies.
- ✧ All personnel involved with ignition and holding will have a radio with frequencies that will provide communication with multiple stations as needed.

This burn is based upon the following complexity analysis. This analysis uses standard weighting factors and the same rating values detailed in FIREBASE. A complexity value of 115 or less suggests a low complexity burn, allowing a type 3 prescribed fire burn boss (RXB3), a value between 115 and less than 280 requires a type 2 burn boss (RXB2), while a value that exceeds 280 requires a type 1 burn boss (RXB1).

Complexity Element	Rating Value	Weighting	Total Score
Potential For Escape	3	10	30
Values at Risk	1	10	10
Fuels / Fire Behavior	3	5	15
Fire Duration	3	5	15
Smoke Mgt. / Air	3	7	21
Ignition Methods	3	3	9
Management Team Size	5	3	15
Treatment Objectives	3	7	21
Total Complexity			**136**

Fire History:

Contingency Plan for Escaped Fires:

In the event that an escape fire occurs (prescription parameters are exceeded and/or line holding capabilities fail) immediate suppression action will be taken and the prescribed fire ignition will cease until the situation is resolved or mitigated to allow continuation of the burn. Fire crossing control lines does not necessarily constitute an escape fire situation. The Burn Boss will determine when an escape fire has happened. Where the fire crosses control lines, holding forces will attempt to use existing natural or manmade barriers to contain the unlined fire. When an escape fire occurs the Burn Boss will act as the Incident Commander. In the event of an escape fire notification will be made to the Hanford Reach National Monument management staff and to the appropriate fire district cooperators.

Holding Plan:

Firing Plan:

Rehabilitation Needs:

IV. IGNITION, BURNING AND CONTROL

a. Acceptable Prescription Range

Timing	Low	High	Desired	Actual
Time of Year				
Time of Day				
Environment				
Fire Behavior Fuel Model				
Temperature				
Relative Humidity				
Wind Direction				
Wind Speed 20 ft.				
Mid-Flame Wind Speed				
Fuel Moisture Percent				
1 Hour				
Smoke Management				
Mixing height				
Transport Wind Speed				

Fire Behavior:

	Head	Flanking	Backing	Actual
Rate Of Spread chains per hour				
Flame Length (ft.)				
NFDRS Fuel Model				

Ignition operation:

Drip torches will be used to achieve ignition of the majority of the unit. A Very pistol may be used to generate heat in areas of the interior of the unit where access is limited or the safety of the igniter may be compromised in an attempt to hand ignite, these areas will be determined as circumstances warrant.

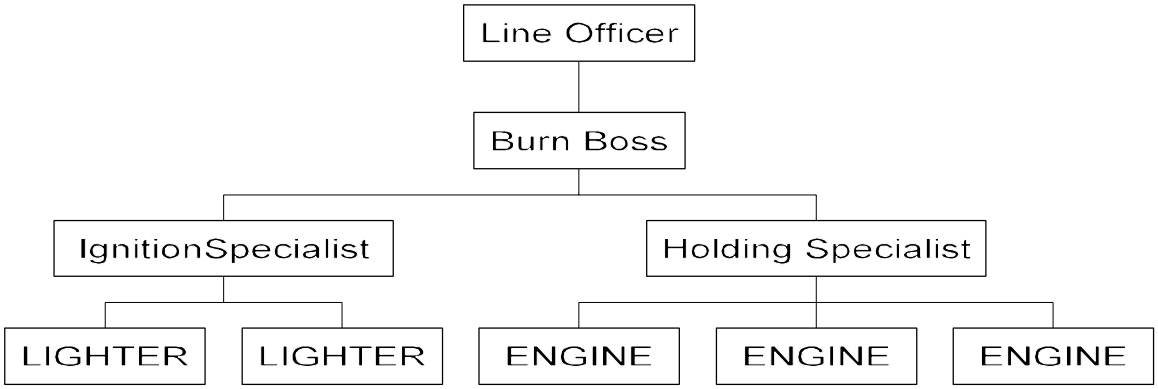
Ignition Technique:

Test Burn:

Ignition of a test burn will aid in determining the success of the of the burn unit and gauge the effectiveness of smoke management planning. The test burn will be approximately a tenth acre and contains similar fuels, fuel loading, fuel arrangement and fuel compaction as the remainder of the burn unit. The ignition of this unit will follow a similar pattern as what would be used on the larger portion of the burn unit. Results witnessed on the test burn will be used to determine if the

actual burning conditions meet those specified in the prescription for fire behavior and smoke transport and dispersion.

Prescribed Fire Organization:



V. SMOKE MANAGEMENT

Permits required:

Washington State Department of Ecology Burn Permit, Adams Co. burn permit. Contact the State Department of Ecology to find out if it is a burn day.

Prevailing winds: Winds predominantly occur from the Southwest.

Distance and Direction from Smoke Sensitive Area(s):

Location	*Direction*	*Miles From Burn Unit*

Necessary Transport Wind Direction and Elevation:

Preferred wind direction is from the Southwest and mixing height should be 500 meters or greater. This information will be extracted from the local and spot weather forecasts specific for the burn area and for the day of the burn.

Visibility Hazard(s):

Residual Smoke Problems:

Potential Public Complainants:

Particulate emissions in Tons/Acre:

VI. FUNDING AND PERSONNEL

Accounting Data: 13510-9263-_____

	Planning	Preparation	Execution	Evaluation	Total
Personnel: Base- 9263					0
Personnel: Base- Other					0
Overtime					0
Equipment / Supplies					0
Contracted Services					
Total	0	0	0	0	0

VII. REPORTS

Scheduling:

Times when the burn is not allowed.

1202 Submission Data:

Ignition Date:
Date Declared Out:
Date 1202 Submitted:

VIII. BURN-DAY ACTIVITIES

Public/Media Contacts on Burn Day:

Crew and Equipment Assignments:

Burn Boss will brief personnel on assignments during crew briefing.

Burn Objectives:

See General Description of Burn Unit.

Description of Burn Area:

See General Description of Burn Unit.

Review Map of Burn

- ✧ **Topographical Features**
- ✧ **Acreage**
- ✧ **Values at Risk**
- ✧ **Roads**
- ✧ **Access**
- ✧ **Water Sources**
- ✧ **Natural or Man Made barriers**

Critical Problem Areas:

Will be covered in the crew briefing.

Fuel Type (Both Inside and Outside the Burn Unit):

See General Description of the Burn Unit.

Expected Weather:

See attached spot and local weather forecasts for wind direction and speed, relative humidity, temperature, fuel moisture, atmospheric stability, and predicted changes.

Communications: See Planning and Actions Section.

Firing Sequence

- ✧ **Test Burn**
- ✧ **Ignition Equipment :** See Ignition, Burning & Control, ignition technique section.
- ✧ **Pattern and Sequence of Firing (Map)**

Contingency Plan for Escaped Fire:

All personnel affiliated with this prescribed burn must keep aware of fire activity that threatens the control lines. In addition, all personnel must keep on the lookout for spots across the line. Any and all of these threats should be reported through the chain of command. Fires outside the burn unit must be suppressed immediately. Leaders of each unit must inform the Ignition Specialist of fire outside the control lines. Based on that information the Ignition specialist will evaluate the need to cease ignition while containing spot fires. The Burn Boss will determine when an escaped fire has occurred. An escaped fire requires the immediate change in strategy to suppression with the Burn Boss becoming the Incident Commander.

Safety:

Lookouts, escape routes and safety zones; inspect personal protective equipment; hazards (footing, smoke [visibility], etc.); potential problems; other (air operations, flammable fuel handling, etc.)

IX. CRITIQUE OF BURN

Were burn objectives within acceptable range of results? (Refer to Section I):

What would be done differently to obtain results or get better results?

Was there any deviation from plan? If so, why?

Problems and general comments:

X. POST-BURN MONITORING

Date:_____ Project Number:_____

Length of Time after Burn:_____

Vegetative Transects:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

XI. FOLLOW-UP EVALUATION

Date:_____ Project Number:_____

Length of Time after Burn:_____

Vegetative Transects:

Comments on Habitat Conditions, etc.:

Photo Documentation:

Other:

Project Name:_ Project Number: _____

GO/NO-GO CHECKLIST

Yes___	No___	Do you have an APPROVED prescribed fire plan?
Yes___	No___	Are ALL fire prescription elements met?
Yes___	No___	Are ALL smoke management specifications met? *1-800-406-5322* Department of Ecology Agriculture Burn Line.
Yes___	No___	Are ALL permits and clearances obtained?
Yes___	No___	Has an area spot weather forecast been obtained and is it favorable?
Yes___	No___	Are ALL required personnel in the prescribed fire plan on site?
Yes___	No___	Has the contingency planning process adequately considered fuels adjacent to and within a reasonable proximity to the burn area?
Yes___	No___	Has the availability of ALL contingency resources been checked, and are they available?
Yes___	No___	Have ALL personnel been briefed on the project objectives and their assignment?
Yes___	No___	Have ALL personnel been briefed on their safety hazards, escape routes, and safety zones?
Yes___	No___	Have ALL the required notifications been made?
Yes___	No___	Are the on-site holding forces adequate for containment under the expected conditions?
Yes___	No___	In YOUR OPINION, can the prescribed fire meet the planned objectives, and can it be carried out according to the approved plan?

I certify that I have reviewed the burn objectives and that I am in agreement that the Prescribed Fire Complexity Analysis is correct, and that all the above questions were answered "YES."

_____ _____
Prescribed Fire Burn Boss Date

_____ _____
Refuge Manager Date

Proceed with a test fire and document the current conditions, location, and results.

PRESCRIBED FIRE MEDICAL PLAN	1. Project:	2. Date Prepared:	3. Time Prepared:	4. Season:

5. Project Medical Aid Station or Clinic

Medical Aid Station	Location	Paramedics Yes or No

6. Transportation

A. Ambulance Service

Name	Address/Location	Phone #	Paramedics Yes or No

B. Air Ambulance or Flight for Life

Name	Address/Location	Phone #	Paramedics Yes or No

7. Hospitals

Name	Address/Location	Travel Time Air	Travel Time Gnd	Phone #	Burn Center Y or N	Helipad Y or N

8. Medical Emergency Procedures

9. Directions from nearest hospital or aid station to project via ground transportation

10. Latitude/Longitude and ground contact frequency of project air evacuation helispot

Latitude:	Longitude:	Frequency:

Prepared By:	Reviewed By: (Safety Officer)

Note: Refer to Zone Specific Medical Plan.

UNIT LOG	1. Incident Name	2. Date Prepared	3. Time Prepared
4. Unit Name/Designators	5. Unit Leader (Name and Position)		6. Operational Period

7. Personnel Roster Assigned

Name	ICS Position	Home Base

8. Activity Log

Time	Major Events

9. Prepared by (Name and Position)

PRESCRIBED BURN PROJECT OBJECTIVES	**Project Name:** **Burn Unit:**	**Prepared By:**	**Date:**

Season of Implementation:

Resource Management Objectives

Specific Management or Administrative Constraints

Inter-Resource Coordination *(check appropriate resource functions)*

☐ Timber ☐ Wildlife ☐ Cultural ☐ Soils ☐ Recreation ☐ Hydrology

☐ Fisheries ☐ Minerals ☐ Range ☐ Special Uses _____Other(specify)

Supporting Document Checklist
(check if required and show date completed or approved))

	Required	Completed
Appropriate NEPA Analysis & Documentation	☐	
Cooperator Agreement	☐	
Annual/Project Work Plan	☐	
Activity Plan (AMP, etc.)	☐	
Clearances (T&E, Arch., Claims, Access, etc.)	☐	
Other (specify) _____	☐	

Total Project Funds Available: Estimated Cost per Pile:

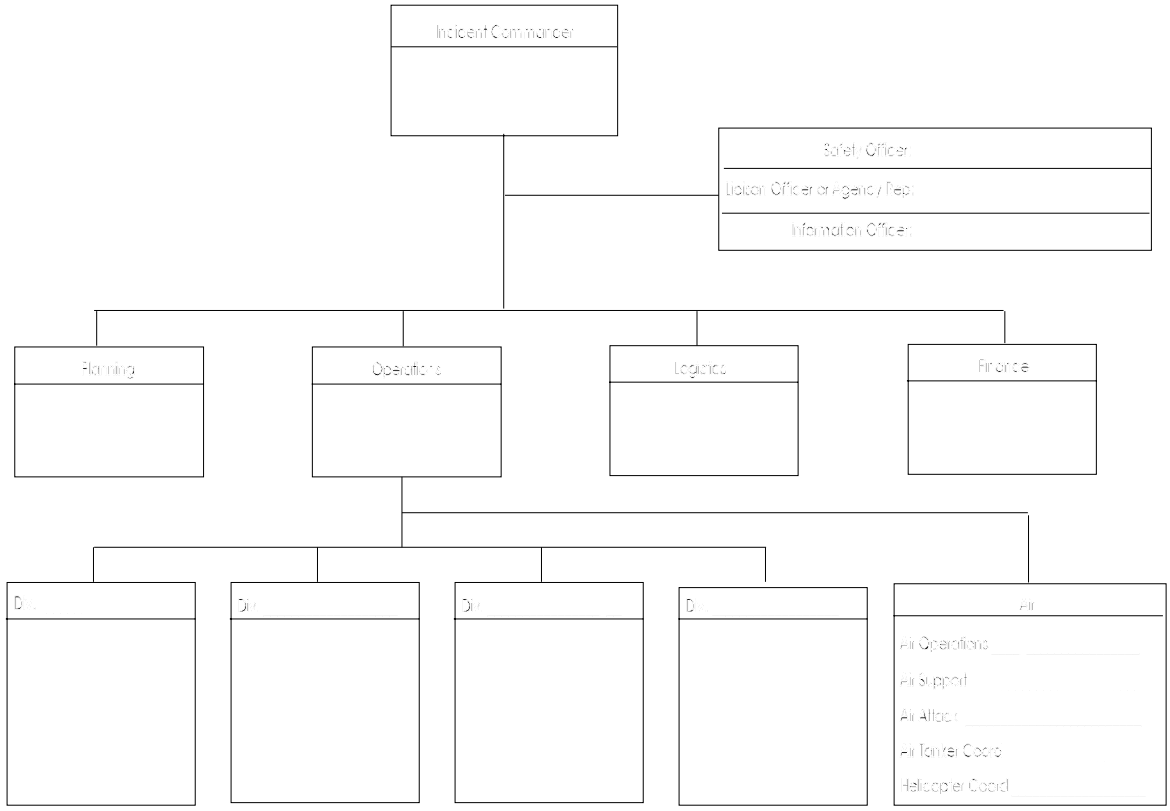
Estimated Total Project Cost: Project Charge or Mgmt Code:

Res. Specialist Review:	Zone FMO Review:	Rx Fire Manager Review:

INCIDENT BRIEFING	1. Incident Name	2. Date	3. Time

4. Map Sketch

5. Current Organization



Page 140 of	6. Prepared by (Name and Position)

6. Resources Summary			
Resources Ordered	Resource Identification	ETA On Scene	Location/Assignment
7. Summary of Current Actions			

Page 2 of	

INCIDENT OBJECTIVES	1. Incident Name	2. Date	3. Time

4. Operational Period

5. General Control Objectives for the Incident (include alternatives)

6. Weather Forecast for Period

7. General Safety Message

8. Attachments (mark if attached)		
Organization List - ICS 203	Medical Plan - ICS	(0ther)
Div. Assignment Lists - ICS 204	Incident Map	
Communications Plan - ICS 205	Traffic Plan	

9. Prepared by (Planning Section Chief)	10. Approved by (Incident Commander)

INCIDENT RADIO COMMUNICATIONS PLAN	1. Incident Name	2. Date/Time Prepared	3. Operational Period Date/Time

4. Basic Radio Channel Utilization					
Radio Type/Cache	Channel	Function	Frequency/Tone	Assignment	Remarks
King NIFC					
King NIFC					
King NIFC					
King NIFC					
King NIFC					
King NIFC					
King NIFC					
King NIFC					

5. Prepared by (Communications Unit)

MEDICAL PLAN	Incident Name	Date Prepared	Time Prepared	Operational Period

5. Incident Medical Aid Station

Medical Aid Stations	Location	Paramedics Yes No	

6. Transportation

A. Ambulance Services

Name	Address	Phone	Paramedics Yes No	

B. Incident Ambulances

Name	Location	Paramedics Yes No	

7. Hospitals

Name	Address	Travel Time Air	Travel Time Ground	Phone	Helipad Yes	Helipad No	Burn Center Yes	Burn Center No

8. Medical Emergency Procedures

Prepared by (Medical Unit Leader)	10. Reviewed by (Safety Officer)

Incident Intelligence Summary (ICS-209)

Date	Time	Initial | | Update | | Final | |	Incident Number	Incident Name

Incident Type	Start Date/Time	Cause	Incident Commander	IMT Type	State/Unit

County	Latitude and Longitude	Short Location Description (in reference to nearest town):

Current Situation

Size/Area Involved	% Contained or MMA	Expected Containment Date: Time:	Line to Build (# chains)	($) Costs to Date	Declared Controlled Date: Time:

Injuries Today	Fatalities	Structure Information		
		Type of Structure	# Threatened	# Destroyed
Threat to Human Life/Safety: Evacuation(s) in progress _____ No evacuation(s) imminent _____ Potential future threat _____ No likely threat _____		Residence		
		Commercial Property		
		Outbuilding/Other		

Fuels Involved	Resources threatened (kind(s) and value/significance):
Current Weather Conditions Wind Speed: Temperature: Wind Direction: Relative Humidity:	Resource benefits/objectives (for prescribed/wildland fire use):

Today's observed fire behavior (leave blank for non-fire events):

Significant events today (closures, evacuations, significant progress made, etc.):

Committed Resources

Agency	CRW1		CRW2		HEL1	HEL2	HEL3	ENGS		OVHD	DOZR		WTDR	Camp Crews	Total Personne
	SR	ST	SR	ST	SR	SR	SR	SR	ST	SR	SR	ST	SR		

Cooperating Agencies Not Listed Above:

Prepared by:	Approved by:	Sent to: by: Date: Time:

Outlook

Estimated Control	Projected Final Size	Estimated Final Cost	Tomorrow's Forecasted Weather
Date: Time:			Wind Speed: Temperature: Wind Direction: Relative Humidity:

Critical Resource Needs (kind & amount, in priority order):

1.
2.
3.

Actions planned for next operational period:

Projected incident movement/spread during next operational period (leave blank for non-fire incidents):

Major problems and concerns (control problems, social/political/economic concerns or impacts, etc.) Relate critical resource needs identified above to the Incident Action Plan.

For fire incidents, describe resistance to control in terms of:

1. Growth potential -

How likely is it that containment/control targets will be met, given the current resources and suppression strategy?

Projected Demobe Start (date and time):

Remarks:

UNIT LOG	1. Incident Name	2. Date Prepared	3. Time Prepared
4. Unit Name/Designators	5. Unit Leader (Name and Position)		6. Operational Period

7. Personnel Roster Assigned

Name	ICS Position	Home Base

8. Activity Log

Time	Major Events

9. Prepared by (Name and Position)

INCIDENT/ PROJECT ORDER NUMBER

RESOURCE ORDER	INITIAL DATE/TIME	2. INCIDENT/PROJECT NAME	3. INCIDENT/PROJECT ORDER NUMBER	4. OFFICE REFERENCE NUMBER
OVERHEAD				

5. DESCRIPTIVE LOCATION/RESPONSE AREA	6. SEC.	TWN	RNG	Base MDM	8. INCIDENT BASE/PHONE NUMBER	9. JURISDICTION/AGENCY
	7. MAP REFERENCE					10. ORDERING OFFICE

11. AIRCRAFT INFORMATION			LAT.		LONG.			
BEARING	DISTANCE	BASE OR OMNI	AIR CONTACT	FREQUENCY	Ground Contact	FREQUENCY	RELOAD BASE	OTHER AIRCRAFT HAZARDS

12. Request Number	Ordered Date/ Time	From / To	Q T Y	RESOURCE REQUESTED	Needed Date/Time	Deliver To	To / From	Time	Agency ID	RESOURCE ASSIGNED	ETD / ETA	RELEASED Date	RELEASED To	Time ETA
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13. Req. No.	ORDER RELAYED Date	Time	To/From	ACTION TAKEN	ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN

13. ORDER RELAYED					ORDER RELAYED				
Req. No.	Date	Time	To/From	ACTION TAKEN	Req. No.	Date	Time	To/From	ACTION TAKEN

Request Number	REMARKS

2. INCIDENT/PROJECT NAME	3. INCIDENT PROJECT ORDER NO.	ESTIMATED COST	ORDER COMPLETED BY
			INITIALS DATE TIME

Spot Weather Forecast
Delegation of authority
DI-1202
Dispatch cards
Radio Log
Report of fire occurrence
Field Report
Local IC Briefing
Complexity Analysis

WILDLAND FIRE SITUATION ANALYSIS

•Jurisdiction: **US Fish and Wildlife Service**	•Geographic Area: **Northwest Coordination Center**
•Unit: National Wildlife Refuge	•WFSA Number of .
•Fire Name:	•Incident Number:
•Accounting Code: 13700-9261	
•Date/Time prepared / / @ : .	
•Attachments	
-Complexity Analysis X	
-Risk Assessment/Analysis X	
Probability of success	
Consequences of Failure	
-Maps	
-Decision Tree	
-Fire Behavior Projections X	
-Calculations of Resource Requirements	
-Other	

OBJECTIVES AND CONSTRAINTS

•Objectives (Must be specific and measurable) These objectives must be considered in the development of alternatives in III, below. Suppression objectives must relate to the Unit resource management objectives.

•Safety (These must receive the highest priority)

-Public

-Firefighter

•Economic (May include closure, which could impact the public through transportation, communication and resource values)

•Environmental (e.g. management objectives for wildlife habitat, water quality, etc.)

•Social (May include local attitudes twoards fire that might affect decisions on the fire)

•Other (e.g. legal or administrative constraints needing consideration such as fire encroaching onto other jurisdictions)

•Constraints (e.g. environmentally and culturally sensitive areas, irreprarable damage to resources, and economic constrants)

ALTERNATIVES

	A.	B.	C.
Wildland Fire Strategy	e.g. Allow fire to play a natural role	e.g. Aggressive attack	
Narrative			
Resources Needed Hand Crews Engines Dozers Air Tankers Helicopters			
Final Size			
Est. Contain/ Control Date			
Costs			
Risk Assessment -Probability of success -Consequence of failure			
Complexity			
Attach maps for each alternative			

EVALUATION OF ALTERNATIVES

	A.	B.	C.
Evaluation Process			
Safety Firefighter Aviation Public			
Sum of safety values			
Economic Forage Improvements Recreation Water Wildlife Other			
Sum of economic values			
Environmental Air Visual Fuels T&E Species Other			
Sum of environmental values			
Social Employment Public Concern Cultural			

Other			
Sum of social values			
Other			
Sum of other values			
TOTAL			

ANALYSIS SUMMARY

	A.	B.	C.
Compliance with Objectives Safety Economic Environmental Social Other			
Pertinent Data Final fire size Complexity Suppression cost Resource values Probability of success			
External/Internal Influences			

VI. DECISION

The Selected Alternative is: .

Rationale:

Agency Administrator's Signature Date/Time

VII. DAILY REVIEW

			PREPAREDNESS LEVEL	INCIDENT PRIORITY	RESOURCE AVAILABILITY	WEATHER FORECAST	FIRE BEHAVIOR PREDICTIONS	WFSA VALID
Date	Time	By						

VIII. FINAL REVIEW

The elements of the selective alternative were met on:

Date Time:

By:

Agency Administrator

Instructions: This checklist should be completed when a wildland fire escapes initial attack and should be kept as a part of the fire records. To assemble and move an Incident Management Team to a wildland fire takes approximately two to four hours for a Type III Team, three to 6 hours for a Type II Team, five to eight hours for a Type I Team. This document is prepared concurrently with the preparation of, and is attached to, a new or revised Wildland Fire Situation Analysis. This complexity analysis should, where possible, be based on prediction to allow adequate time for assembling and transporting the ordered resources to the incident.

Use of the Guide:

1. Analyze each element and check the answer yes or no.
2. Consider the primary factors (A through G) as a positive response if the number of positive responses exceed, or are equal to, negative responses within any primary factor.
3. If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is, or is predicted to be a Type I incident.
4. Factor H should be considered after all of the above steps. Consider a Type I team if more than two of the items in H is positive and three or more of the primary factors is positive. Consider a Type II team if the composite of H is negative and fewer than three of the primary factors (A-G) is positive. Allow the exiting overhead team to continue action on the fire if all of the questions in H are answered negatively.

FIRE BEHAVIOR – Observed or predicted

	YES	NO
Burning Index is predicted to be above the ninetieth percentile for the major fuel model in which the fire is burning.		
Potential exists for extreme fire behavior conditions, e.g. fuels, weather and topography that excessively endangers personnel.		
Crowning, profuse or long range spotting is occurring.		
Weather forecast conditions indicate either no significant relief or worsening conditions.		
TOTAL		

RESOURCES COMMITTED

	YES	NO
Two hundred or more personnel assigned.		
Three or more divisions		
Increasing number and variety of support personnel and/or equipment.		
Substantial air operation which is not properly staffed.		
Majority of unit's initial attack resources are committed		
TOTAL		

UNIT RESOURCES THREATENED

	YES	NO
Urban interface.		
Developments and facilities.		
Restricted, threatened or endangered species habitat or in the case of flora, threat to the species itself.		
Cultural sites.		
Unique natural resources, special designation zones, or wilderness		
Other special resources		
TOTAL		

SAFETY

	YES	NO
Unusually hazardous fireline conditions, e.g. extended burnout or backfire situations, rock slides, cliffs, extremely steep terrain, abnormal fuel situation such as frost killed foliage, etc.		
Serious accidents or fatalities		
Threat to safety of unit visitors from fire and related operations.		
Restrictions and/or closures in effect, or being considered.		
No night operations in place for safety reasons.		
TOTAL		

JURISDICTION

	YES	NO
Fire burning in, or threatening, more than one jurisdiction.		
Potential for claims for damages.		
Different or conflicting management objectives.		
Disputes over fire management responsibility because of a lack of agreement or differing interpretations of fire management.		
Potential for unified command.		
TOTAL		

FIRE COMPLEXITY ANALYSIS (Page 2)

EXTERNAL INFLUENCES

	YES	NO
Controversial fire policy, which often occurs when the fire involves multiple ownership.		
Pre-existing controversies/relationships. Not necessarily restricted to fire management: any controversy drawing public attention to an area may present unusual problems to the Team and local management.		
Sensitive media relationships.		
Smoke management problems which creates a significant public response such as smoke in a metropolitan area or visual pollution in a high-use scenic area.		
Sensitive political interests.		
Other external influences.		
TOTAL		

CHANGE IN STRATEGY

	YES	NO
Change in strategy to control from confine or contain.		
Large amounts of unburned fuel within planned perimeter.		
WFSA is invalid or requires updating.		
TOTAL		

If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is, or is predicted to be a Type I incident.

EXISTING OVERHEAD

	YES	NO
Worked two operational periods without achieving initial objectives.		
Existing management organization ineffective.		
Overhead personnel are over-extended mentally and/or physically. This is a critical item requiring judgement by the responsible agency and is difficult to assess because of the wide differences between individuals. However, if the Agency Administrator feels the existing overhead cannot continue to function efficiently and take safe and aggressive action because of mental or physical reasons, assistance is mandatory.		
Incident Action Plans, briefings missing or poorly prepared.		
TOTAL		

Factor H should be considered after completing the primary factors (A-G). Consider a Type I team if more than two of the items in H is positive and three or more of the primary factors is positive. Consider a Type II team if the composite of H is negative and fewer than three of the primary factors (A-G) is positive. Allow the exiting overhead team to continue action on the fire if all of the questions in H are answered negatively.

Prepared by . Date: .

FLIGHT AND GROUND HAZARDS BRIEFING

I **have received** a **flight and ground hazards briefing on the Hanford Site located near Richland, Washington. The briefing covered the following subjects:**

Operation and location of Hanford Fire Stations.

Tri-City Fire Station.
Contact 121.80-135.3 or 545-3471

How to contact Hanford Patrol for flight following and emergency notification. Notify Security 24-hours in advance 375-2154 Hanford Patrol Operations Center 373-3800 Air to Ground Communications 123.10
Emergency Number 375-2400

Location of surface contamination areas that may be penetrated in the event of an emergency landing.

Review of radiation identification signs.

Building and facilities overflight restriction

Location of power lines, smoke stacks and towers.

Location of eagle nesting areas.

General location of animal population

Restrictions concerning flying around the animal population.

PT A **Range -WPS -Range**

Aircraft collision lights and landing lights will be on during daylight and nighttime mission operations below 10,000 ft.

The flight crew will monitor UNICOM -and broadcast their location when in the vicinity of local uncontrolled civilian airfields (Richland) -122.7.

The aircraft must request flight following from A TC for both day and night missions. This requirement will help provide traffic avoidance from other aircraft and increase emergency response capabilities. 128.75.

I fully understand the restrictions of overflying buildings and facilities, the location and height of flight obstruction, where no-fly areas are located and restriction to flying in the vicinity of site animal populations.

DATE:

SIGNATURE:

COMPANY

AIRCRAFT PREFLIGHT CHECKLIST AND SAFETY MEETING DOCUMENTATION

Contract No./W.O. No._____ Total Hours Allotted for Project_____

Period of Performance_____ through_____

Project/Organization_____ Flight Date _____

Describe the meeting topics, and description of flight:_____

_____

_____

PREFLIGHT CHECKLIST

Fire Extinguisher Onboard_____ First Aid Kit on Board_____

Visibility_____ Ceiling_____ Winds_____

Take Off Wt & CG_____ Max Take Off Wt & CG_____
Min Landing Wt & CG_____ Max Forward & AFT CG Limits_____

Airworthiness Certificate properly changed to "Restricted" with appropriate entry to airframe log book? Yes_____ No_____ N/A_____

Aircraft Takeoff Time: Take Off_____ Landing_____ Work Order Remaining Hours_____

MILITARY NOTIFICATIONS:

Yakima Firing Center - 509/577-3671: Yes_____ N/A_____

McCord A.F.B. – 253/982-9925: Yes_____ N/A_____

Whidbey Island Naval Air Station VR1350 - 360/257-2877: Yes_____ N/A_____
FSS 1-800 WX BRIEF AND FLIGHT PLAN: Yes_____ N/A_____

NAMES OF CREW MEMBERS: _____

_____ _____

NOTIFICATIONS:

Line Manager_____ Telephone No._____

Security_____ Telephone No. 509/375-2154 (PNNL)
Telephone No. 509/373-3800 (FDH)

POST-FLIGHT (report any hazards, incidents, or safety recommendations):_____

_____

Form 9400-1a
(May 1993)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

AIRCRAFT FLIGHT REQUEST/SCHEDULE

Change #

6. Aircraft Information
FAA N#

1. Initial request information

Initial Date/Time	To/From	Phone Number

Cost-Account/Management Code(s)

Billee Code (OAS A/C only)

Flight Schedule No. | PAX Seats

Make/Model

Color

Vendor

Phone No.

Pilot(s)

Check one: ☐ Point-to-Point Flight ☐ Mission Flight Desired A/C Type: ☐ Helicopter ☐ Airplane

Mission Objective/Special Needs:

2. Passenger/Cargo Information – Indicate Chief of Party with an asterisk (*)

NAME/TYPE OF CARGO	LBS OR CU FT	PROJECT ORDER/ REQUEST NO.	DEPT ARPT	DEST ARPT	RETURN TO	NAME/TYPE OF CARGO	LBS OR CU FT	PROJECT ORDER/ REQUEST NO.	DEPT ARPT	DEST ARPT	RETURN TO

3. Flight Itinerary (For Mission-Type Flights, Provide Points of Departure/Arrival and Attach Map with Detailed Flight Route and Known Hazards Indicated)

DEPART WITH			DEPART FROM			ENROUTE	ARRIVE AT			DROP OFF		KEY POINTS	INFO RELAYED
Date	No. Pax	Lbs.	Airport/Place	ETD	ATD	ETE	Airport/Place	ETA	ATA	No. Pax.	Lbs.	Drop-Off Points, Refueling Stops, Flight Check-Ins, Pickup Points	To/From

4. Flight Following

☐ FAA IFR ☐ Satellite

☐ FAA VFR With Check-In Every _____ Minutes To

☐ FAA or ☐ Agency

☐ Agency VFR With Check-In via radio Every _____ Minutes

Frequency(ies):

5. Method of Resource Tracking:

☐ Phone ☐ Radio

☐ To Scheduling Dispatcher @ _____ (Phone Number)

☐ Prior to Takeoff ☐ Each Stop Enroute ☐ Arrival at Destination

☐ To: _____ (Other Office) @ _____ (Phone Number)

7. Administrative

Type of Payment Document:

☐ OAS-23 or ☐ OAS 2

☐ FS 6500-122

Other

Route Document To:

8. Review (If applicable)

☐ Hazard Analysis Performed

☐ Dispatch/Aviation Mgr. Checklist

☐ Other:

9. Close-out Closed by:
Date/Time:

(Hazard Analysis and Dispatch/Aviation Manager Checklist on reverse)

CHECKLIST FOR IMPLEMENTING TEMPORARY FLIGHT RESTRICTIONS (2/12/99)

ACTION	TO/FROM	DATE/TIME
1. Determine Need For TFR and/or Deconfliction By The Military Using Criteria in Figure APP 4-1		
2. Plot Incident Or Project Location Using Maps And/Or Computer-Aided Hazard Information System; If Special-Use Airspace or Military Training Routes Involved, Perform Steps 6 and/or 7 Prior To Steps 4-5.		
3. Complete Resource Order With Interagency Request For TFR And Documentation of Contacts Requesting Deconfliction of Airspace By The Military Attached		
4. Contact FAA ARTCC With Request For TFR: Request Call-Back With Confirmation		
5. Inform FAA FSS Of Request Made To ARTCC Request Advisory NOTAM If Necessary		
6. If Special-Use Airspace (MOAs, RAs, etc.) Involved, Contact Military Scheduling Agency And Request Deconfliction Of Airspace Until TRF Granted By FAA;		
7. If Military Training Route(s) Involved, Contact Military Scheduling Activity And Request Deconfliction Of Airspace Until TRF Granted By FAA;		
8. Relay Copy Of TFR Request To Area Or Zone Coordination Center		
9. All Aircraft and Incident Commander Informed Of TFT Status And, If Appropriate, Status Of Activity In Special-Use Airspace Or Along Military Training Route(s)		
10. Air Attack, Lead Plane, and/or Aerial Observer Ordered If Appropriate		
11. Document Call-Back Confirmations Received On The "Interagency Request For Temporary Flight Restriction" And On The "Documentation Of Contacts Requesting Deconfliction Of Airspace By the Military."		

CHECKLIST OF ACTIONS TO BE TAKEN ON AIRSPACE CONFLICTS (2/12/99)

ACTION	DATE/TIME	TO/FROM
LOCAL		
Conflict reported from the field to dispatch immediately; Dispatch obtains aircraft observation information.		
OAS-34 or FS 5700-14 initiated immediately;		
Dispatch contacts both FAA ARTCC and, if appropriate, other controlling facilities (eg. military) to and obtain identification of the non-participating aircraft and correct the problem.		
Conflict reported from dispatch to State/Area/Regional aviation manager immediately.		
STATE/AREA/REGIONAL		
After verification of a conflict, State, Area, or Regional aviation manager contacts the following		
Military (if appropriate) Scheduling Agency (SUA) or Activity (MTR);		
Military representative at FAA Regional Office;		
National aviation safety manager;		
Agency's Airspace Committee representative;		
OAS-34 or FS 5700-14 completed and submitted;		
If appropriate, contact FAA Flight Standards District Office;		
FAA INMAC report submitted for Near Mid-air Collisions		

REMARKS:

HAZARD ANALYSIS AND DISPATCH/AVIATION MANAGER CHECKLIST

I. MISSION FLIGHT HAZARD ANALYSIS (Fire flights exempt provided a pre-approved plan is in place). The following potential hazards in the area of operations have been checked, have been identified on flight itinerary map, and will be reviewed with Pilot and Chief-of-Party prior to flight.

- ☐ Military Training Routes (MTRs) or Special-Use Airspace (MOAs, Restricted Areas, etc)
- ☐ Areas of high-density air traffic (airports); Commercial or other aircraft
- ☐ Wires/transmission lines; wires along rivers or streams or across canyons
- ☐ Weather factors; wind, thunderstorms, etc.
- ☐ Towers and bridges
- ☐ Other aerial obstructions
- ☐ Pilot flight time/duty day limitations and daylight/darkness factors

  SUNRISE _____

  SUNSET _____
- ☐ Limited flight following communications
- ☐ High elevations, temperatures, and weights:

  MAX LANDING ELEV (MSL) _____

  MIN FLIGHT ALTITUDE AGL. _____
- ☐ Transport of hazardous materials
- ☐ Other _____

  _____

II. DISPATCHER/AVIATION MANAGEMENT CHECKLIST

- ☐ Pilot and aircraft carding checked with source list and vendor, carding meets requirements
- ☐ Or, Necessary approvals have been obtained for use of uncarded cooperator, military, or other government agency aircraft and pilots
- ☐ Check with vendor that an aircraft with sufficient capability to perform mission safely has been scheduled
- ☐ Qualified Aircraft Chief-of-Party has been assigned to the flight (noted on reverse)
- ☐ All DOI passengers have received required aircraft safety training
- ☐ OR, Aviation manager will present detailed safety briefing prior to departure
- ☐ Bureau Aircraft Chief-of-Party will be furnished with Chief-of-Party/Pilot checklist and is aware of its use
- ☐ Means of flight following and resource tracking requirements have been identified
- ☐ Flight following has been arranged with another unit if flight crosses jurisdictional boundaries and communications cannot be maintained
- ☐ Flight hazard maps have been supplied to Chief-of-Party for non-fire low-level missions
- ☐ Procedures for deconfliction of Military Training Routes and Special-Use Airspace have been taken
- ☐ Chief-of-Party is aware of PPE requirements
- ☐ Cost analysis has been completed and is attached
- ☐ Other/Remarks:

NOTE: Reference Handbook 9420 for approval(s) required.

A. MISSIONS FLIGHT: Hazard Analysis Performed By:

_____
(Chief-of-Party Signature)

B. MISSION FLIGHTS: Hazard Analysis Reviewed By:

_____
(Dispatcher or Aviation Manager Signature Required))

C. If Non-Fire, One-Time (Non-Recurring), Special-Use Mission, Signature of Line Manager Is Required**):

_____ _____
(Chief-of-Party Signature) (Date)

D. This Flight is Approved By:

_____ _____
(Authorized Signature) _ (Date)

** *For recurring Special-Use Mission, signature is required on Special-Use Air Safety Plan, and not required here.*

PASSENGER AND CARGO MANIFEST

NUMBER OF PASSENGERS ON THIS PAGE:

ORDERING UNIT:	PROJECT NAME:	PROJECT NO.:
NAME OF CARRIER:	MODE OF TRANSPORTATION: & I.D. NO.	PILOT OR DRIVER:
CHIEF OF PARTY:	REPORT TO:	IF DELAYED, CONTACT:

DEPARTURE		INTERMEDIATE STOPS			DESTINATION	
PLACE	ETD	ETA	PLACE	ETD	ETA	PLACE

PASSENGER AND OR CARGO NAME	M	F	PASSENGER WEIGHT	CARGO WEIGHT	DUTY ASSGMT IF APPLICABLE	HOME UNIT
1.	☐	☐				
2.	☐	☐				
3.	☐	☐				
4.	☐	☐				
5.	☐	☐				
6.	☐	☐				
7.	☐	☐				
8.	☐	☐				
9.	☐	☐				
10.	☐	☐				
11.	☐	☐				
12.	☐	☐				
13.	☐	☐				
14.	☐	☐				
15.	☐	☐				
16.	☐	☐				
17.	☐	☐				
18.	☐	☐				
19.	☐	☐				
20.	☐	☐				
21.	☐	☐				
22.	☐	☐				
SIGNATURE OF AUTHORIZED REPRESENTATIVE:						DATE:

pass_cargo_manfst

Appendix I: NEPA document

TABLE OF CONTENTS

PURPOSE AND NEED

Numerous wildland fires occur annually on lands in and surrounding the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge (monument/refuge). Many of these fires are human-caused resulting from vehicle ignitions from roads and highways, unattended campfires, burning of adjacent agricultural lands and irrigation ditches, and arson. Fires of natural origin (lightning caused) also occur on lands within and adjacent to the monument/refuge.

Prior to alteration of the shrub-steppe of eastern Washington in the late1800's/early 1900's, big sagebrush/bluebunch wheatgrass was the dominant vegetation type within the and over much of the Columbia Basin (Daubenmire, 1970). The natural fire regime was small, high-intensity fires with a long fire-return interval.

Since the early 1900's, fire suppression, land use practices, and exotic species invasion have altered plant community structure and composition, changed historic landscapes, and altered the fire regime by contributing to artificially high fuel loads. The contemporary fire regime is large, high intensity fires with a shorter fire return interval. This regime is causing declines in fire-intolerant sagebrush stands and increases in exotic species, primarily cheatgrass and tumbleweed. Once exotic species are established, it is unlikely that native vegetation communities will return without extensive restoration. The invasion of non-native plants represents a threat to the integrity of the monument and the preservation of it's unique biodiversity through loss of native vegetation, loss of wildlife habitat, and alteration of historic landscapes.

There is a need to reestablish the natural fire regime of the monument/refuge, and to use prescribed fire and other management tools to reduce hazardous fuels accumulation, maintain fire breaks, eliminate exotic vegetation, restore native communities, improve wildlife habitat, and restore and maintain the historic landscape. The purpose of the Fire Management Plan is to provide for the perpetuation of natural conditions and processes within the monument/refuge, while managing wildland fire to protect life, property, and cultural resources. The Plan will guide fire management procedures to ensure that fire management practices are appropriate, current, and environmentally sound.

FWS policy requires that each refuge complete a Comprehensive Conservation Plan (CCP) to direct overall refuge program activities, and a Fire Management Plan to direct specific fire program activities. The monument/refuge will initiate a CCP once funding is appropriated. This Fire Management Plan precedes the CCP because fire management is necessary under emergency situations, and is an essential management tool to reduce hazards associated with unplanned fire events.

The Wildland Fire Management Handbook (USFWS 2000) further defines the FWS goal of wildland fire management to achieve resource objectives through preventing human-caused wildland fires, minimizing negative impacts on resources from all wildland fires, and using prescribed fire to benefit natural and cultural resources while minimizing risk to employees, visitors, neighbors and property.

ALTERNATIVES

The following alternatives were analyzed for this environmental assessment. All of the alternatives have certain features in common. Under each alternative, appropriate suppression response would be taken on all wildland

fires, including human- and lightning-caused ignitions. Low impact wildland fire suppression tactics (e.g. cold-trailing, using water, using natural and manmade barriers, avoiding surface disturbance and high-intensity burning in sensitive areas) will be used to the fullest extent possible. Surface disturbing actions associated with full suppression could include the use of water, foam retardant, building fire line with hand crews, and use of equipment (fire engines, etc). The use of ground disturbing equipment, such as dozers and graders, within the monument/refuge must be approved by the Project Leader or Designee on a fire-by-fire basis. Fire breaks would be maintained through mechanical manipulation along corridors with historic human-caused ignitions. Fire management activities will be planned and conducted with interdisciplinary teams in accordance with the laws, regulations and policies governing the protection of sensitive and threatened and endangered plant and animals, and cultural resources.

For alternatives using mechanical treatment, associated actions could include removing brush, constructing and maintaining fire line, and cutting and stacking fuels.

For the alternatives with prescribed fire, all activities would be conducted under Federal and State air quality requirements and best management practices. Prescribed fires, ignited by qualified fire personnel, would be used to accomplish management objectives in the Saddle Mountain Unit under prescribed conditions identified in approved prescribed burn plans. Prescribed burn plans would address timing and fire intensity to minimize impacts to sensitive biological and cultural resources, smoke management, timely notification of public officials and citizens, and contingency planning. Prescribed fires would be designed to create mosaic burn patterns (with only 40-70% of acreage within the fire perimeter actually burned). All prescribed fires would be monitored and be available as research projects. Mechanical preparations would be used as appropriate to prevent prescribed fires from escaping control lines. Mechanical preparations could include the use of chainsaws and hand crews to create fire-line, stack downed fuels for ignition during burning windows, and other actions as appropriate. Fire-line would be rehabilitated as needed to prevent soil erosion and exotic species invasion.

ALTERNATIVE A: FULL SUPPRESSION, MECHANICAL TREATMENT, PRESCRIBED FIRE ON SADDLE MOUNTAIN UNIT ONLY (NO ACTION)

Under the "No Action Alternative", all wildland fires would be suppressed, mechanical treatment could be used, and prescribed fires would be conducted on the Saddle Mountain Unit

ALTERNATIVE B: FULL SUPPRESSION, MECHANICAL TREATMENT, PRESCRIBED FIRE ON ALL MONUMENT/REFUGE UNITS (PROPOSED ACTION)

All wildland fires on the monument/refuge would be suppressed, and prescribed fires would be used as appropriate on all Units of the monument/refuge.

ALTERNATIVE C: FULL SUPPRESSION, MECHANICAL TREATMENT, NO PRESCRIBED FIRE

Under this alternative, all fires on the monument/refuge would be suppressed. Prescribed fire would not be used. Mechanical manipulation would be used to redistribute fuels and remove hazard fuel accumulations and invasive species.

ALTERNATIVE D: FULL SUPPRESSION, NO PRESCRIBED FIRE, NO MECHANICAL TREATMENT

Under this alternative, all fires on the monument/refuge would be suppressed. Prescribed fire and mechanical manipulation would not be used.

ALTERNATIVES CONSIDERED BUT FOUND TO BE INFEASIBLE

No Suppression

Under this alternative all ignitions would be allowed to burn on the monument/refuge. This alternative was found to be infeasible due to unacceptable risk to human life and property, and potential for significant socioeconomic impacts on neighboring rural communities, agriculture and rangelands.

While fire has played an integral role in the history of the shrub-steppe environment, the region's historical fire regime has been greatly altered from socio-political and economic factors. Wildland fires on the Monument/Refuge have increased from historical levels. Coupled with the arrival of invasive species and noxious weeds, this has weakened the natural recovery processes of the shrub steppe ecosystem from disturbance events such as fire. Repeated and/or catastrophic fires would degrade the objects of antiquity for which the Monument/Refuge was established. The FWS would be out of compliance with the FWS policy and the directives of Proclamation 7319, Establishment of the Hanford Reach National Monument.

Wildland Fire Use Program

Under this alternative, unintentional ignitions would be managed in predetermined areas for resource benefits, if all prescription criteria were met. This alternative was found to be infeasible due to staff limitations, valuable natural and cultural resources, and high values at risk on neighboring lands.

Mechanical Treatment of Fuels Only

Under this alternative, hazard fuel buildups would be removed or manipulated strictly by mechanical means to the extent practicable. This alternative was found to be infeasible because of associated exorbitant costs and high potential to result in substantial damage to biological and cultural resources from mechanical equipment.

AFFECTED ENVIRONMENT

GENERAL DESCRIPTION

The Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge includes approximately 195,000 acres sprawling across four counties of south central Washington. The land forms a large C-shaped region, bisected by the Hanford Reach of the Columbia River. All of the land is owned by the Department of Energy and is part of the 360,000 acre Hanford Site. The Hanford Site was established by the US Government in 1943 as a national security area for the production of weapons-grade plutonium and purification facilities. For more than 40 years, the primary mission at Hanford was associated with the production of nuclear materials for national defense. However, large tracts of land were used as protective buffer zones for safety and security purposes and remained undisturbed. These buffer zones preserved a biological and cultural resource setting unique in the Columbia Basin region. The 195,000-acre Hanford Reach National Monument was established by Presidential Proclamation in June, 2000, to protect the nation's only remaining free-flowing stretch of the Columbia River and the largest remnant of the shrub-steppe ecosystem once blanketing the Columbia River Basin. The U.S. Fish and Wildlife Service (FWS) and the Department of Energy are joint stewards of the monument.

FWS-administered lands of the Monument are divided up into four major management units.

The Fitzner-Eberhardt Arid Lands Ecology (ALE) Reserve is a 120 mi 2 (312 km 2) tract of land in the southwestern portion of the Hanford Site. It is designated the Rattlesnake Hills Research Natural Area as a result of a federal interagency cooperative agreement (PNL 1993). The ALE Reserve constitutes the single largest tract in the federal Research Natural Area system for Oregon and Washington (Franklin *et al*. 1972, Rickard 1972), and is one of the few remaining large tracts of shrub-steppe vegetation in Washington that retains a predominant pre-European settlement character (PNL 1993). This area is closed to the public and is maintained for scientific purposes.

The Saddle Mountain Unit of the Monument has been managed by the U.S. Fish and Wildlife Service since 1971 under a 30-day revocable use permit with DOE. This unit is a 50 mi 2 (130 km 2) tract of land located north-northwest of the river and generally south and east of state Highway 24. The Bureau of Reclamation's South Columbia Basin Irrigation District maintains an irrigation return canal that created and sustains the Saddle Mountain Lakes. This area has been closed to public access since the 1940's. Currently, access is available to approved research activities and special uses through the FWS monument headquarters.

The Wahluke Unit of the Monument is a 87 mi 2 (225 km 2) tract of land located north and east of both the Columbia River and the Saddle Mountain NWR. It is bisected by Highway 24. The Bureau of Reclamation's South Columbia Basin Irrigation District maintains several irrigation canals throughout the area. The WB-10 ponds was created and is sustained from irrigation runoff. The Wahluke Unit is open to the public year-round for day use only.

The Columbia River Islands Unit of the Monument is a group of islands within the Columbia River. Seven islands total 320 acres (829 km 2). The islands are seasonally open for limited public use.

PHYSICAL RESOURCES

Climate

The Monument is located within the driest and hottest portion of the Columbia Basin. An almost 50 year record of climate data is available for the central portion of Hanford (Hoitink and Burk 1994). Average weather conditions described here are based on that location and are taken from Cushing (1995). Still, it is important to remember that differences in the topography of the Hanford Site contribute to ecologically significant changes in some aspects of climate, particularly annual mean temperature and precipitation (Cushing 1995). For example, although the average annual precipitation for central portion of Hanford is 6.3 in (16 cm), on the crest of Rattlesnake Mountain annual precipitation can reach up to 13.8 in (35 cm) (Downs et al. 1993). Most precipitation occurs during the winter, with more than half the amount occurring from November through February. Snowfall accounts for about 38% of all precipitation from December through February. Average monthly temperatures range from a low of 30ºF (-0.9 ºC) in January to a high of 76ºF (24.6 ºC) in July. Prevailing wind directions are generally from the northwest in all months of the year, but southwesterly winds also regularly occur. Monthly average wind speeds are lowest during the winter months and highest during the summer.

Physiography

The Monument lies in the heart of the Pasco Basin. Columbia River Basalt, a result of lava flows occurring roughly between 17 and 2 million years ago, underlies the Monument. Several basalt ridges traverse the Monument and provide much of its topographic relief. A stretch of the Columbia River (the Hanford Reach) runs through the Monument and forms part of its southern and southwestern boundary. The Columbia River Plain constitutes the majority of the Monument and is both its lowest (about 360 ft [110 m] along the river) and most arid region.

Prominent natural features of the ALE Reserve Unit of the Monument include the ridge top and mostly north-facing slope of Rattlesnake Mountain, portions of the Rattlesnake Hills, Dry Creek Valley, Cold Creek Valley, and the east end of Yakima Ridge. Two streams, Snively Creek and Dry Creek, and a number of cold springs occur within the ALE Reserve (DOE-RL 1996). Elevations across the ALE Reserve range from about 500 ft (150 m) in the Cold Creek Valley to 3450 ft (1050 m) on top of Rattlesnake Mountain.

Prominent natural features within the Saddle Mountain Unit of the Monument include a portion of the Wahluke Slope, the western end of the White Bluffs geologic formation, the slopes and crest of the Saddle Mountains, and a portion of the Hanford Reach of the Columbia River. The refuge contains several lakes and wetlands created and sustained by raised water tables associated with irrigation drainage and runoff.

Prominent natural features found within the Wahluke Unit of the Monument include: a portion of the Wahluke Slope, the eastern end of the White Bluffs geologic formation, large dune fields above the White Bluffs, the Saddle Mountains (which rise to over 2000 ft [610 m] within the monument/refuge, and several lakes and wetlands created and sustained by raised water tables associated with irrigation drainage and runoff.

FUELS

The fuel types in the shrub-steppe region is typically grass and shrub. The fuel is generally herbaceous plants that are dormant, or are nearly dormant. Occasionally, litter and dead-down stemwood from the open shrub overstory contributes to the fire intensity. Fires in this fuel type are surface fires that move rapidly through the cured grass and associated material. Rarely, brush becomes the primary carrier of fire spread; however, brush requires moderate winds, greater than 8 mph at the mid-flame height, for fire to spread from crown to crown.

FIRE ECOLOGY

Most fires in the area occur during the summer months with the majority of ignitions in June, July, August, and September. Although precipitation free months are rare, these months are generally hot and dry. There are an average of 65 days of 90° F or above during the summer, and the average precipitation during these months is only 0.3 inches per month.

While fire has played an integral role in the history of the shrub-steppe environment, the region's historical fire regime has been greatly altered from socio-political and economic factors. Couple with the arrival of invasive species and noxious weeds, this has weakened the natural recovery processes of the shrub steppe ecosystem from disturbance events such as fire. The Fire Effects Information Service describes the autecology of the major species in the shrub-steppe. Sagebrush does not tolerate fire, while the grasses are fire-tolerant. Because the grasses offer the available to carry a fire and because the native grasses are either short in height (Sandberg's bluegrass) or clumpy (bluebunch wheatgrass), the pre-settlement fires were probably small. Thus, the fire regime for the pre-settlement era was probably small, high intensity fires with a long fire return interval (50-100 years). Sagebrush is a fire intolerant species, and historical densities were typical only 15-25% of the vegetative cover in sagebrush shrub-steppe communities. Small, infrequent fires maintained bunch grass openings within the shrub-steppe, providing for both shrub and grassland communities.

After the 1900's, human activities interrupted the natural fire interval and patterns of burning.

Agricultural development and livestock grazing reduced the light fuels that would normally carry a fire. Livestock grazing also had the effect of suppressing native bunch grasses and allowing sagebrush densities to increase. Beginning until 1906 through the present, fire suppression efforts have resulted in increased sagebrush stand density. This allows for hotter, more destructive fires, due to the closer proximity of each individual plant, which allows fires to spread within the shrub canopy.

Rangeland improvements also brought in a variety of non-native grasses, either as purposeful introductions to provide forage enhancement, or as accidental introductions within seed/pasture mixes. Plants such as cheat grass, tumbleweed, and other annual plants altered native plant community structure. The discontinuous fuel that native bunch grasses provided were invaded by thick, continuous fuels that would carry fires over large areas. Cheatgrass also cures into dry fuel earlier in the fire season than native grasses providing a longer fire season. High mortality of perennial grasses may occur if fire burns in cured litter of annual grasses while perennials are still actively growing. The invasion of cheatgrass has changed the community appearance and altered the fire regime because of an abundance of available and continuous fuel. Natural succession has been altered by cheatgrass such that burned areas do not recover to their former community structure following fire.

The fire frequency has increased due to an increase in human caused ignitions, and the fire size has increased due to changes in fuel structure. The contemporary fire regime is large, high intensity fires with a shorter fire return interval. This has led to a decrease in the fire intolerant sagebrush and a commensurate increase in exotic species, primarily cheatgrass and tumbleweed.

Four different fuel types are currently recognized in the monument/refuge.

I. Native grasslands are characterized by dry, open, grassy areas, with individual grass clumps providing a discontinuous natural fuels. Native, perennial grasses and forbs are found throughout this community. Perennial

grasses and forbs tend to have long, fibrous root structures that can access moisture throughout the soil profile. Thus, native vegetation in this area remains green during the first half of the fire season, curing out during the late summer, July, and August. Fires during late summer can burn within these areas. Perennial grasses may suffer high mortality if fires fueled by cured annual grasses burn perennial species during their active growing season. Fires during late summer can burn within perennial grassland areas. Occasionally, depending upon wind conditions, surface fires can move rapidly through the cured grass and associated materials.

II. Shrub-steppe areas are grasslands that retain a component of shrub as an overstory. Wyoming big sagebrush is the most common, dominant shrub, but there are also communities of three-tip sagebrush, bitterbrush, black greasewood, spiny hopsage, gray and green rabbit brush. Generally, the shrubs burn with greater intensity than the grasses, and produce longer flame lengths. Sagebrush has volatile, flammable chemicals associated with it's foliage. In some areas, the shrubs can burn with such intensity that they permanently destroy the understory plants and create hydrophobic conditions on the soil surface.

III. Riparian and riverine bottoms are occupied by willow dominated communities. Because of their proximity to water, riparian and riverine habitats tend to have a high density of shrubs and trees, and a greater amount of vertical structure. Native and non-native grasses are found in the understory throughout the community. Vegetation in this area remains green during the majority of the fire season, but as the grasses cure the understory becomes more flammable. Dried grasses, and shrubs can provide ladder fuels that burn into the riparian tree canopy and can kill overstory trees. Occasionally, aquatic vegetation can build up such that open water habitat becomes limited. These situations may require fire to reduce such build ups.

IV. Non-native plant communities are dominated by invasive species such as cheatgrass, tumbleweed, and other exotic plants. Cheatgrass germinates in late fall and winter, and cures earlier than native grasses, usually by late June. As the cheatgrass cures it becomes an available abundant and available fuel. Often fires start within the cheatgrass and spread to other adjacent communities. Subsequently, other plants are exposed to burning earlier in the fire season than they historically would have been. This weakens native plants, because they are burned during the peak of their growing cycle, and can allow cheatgrass to spread further into native plant communities. This reduces biodiversity and accelerates the fire cycle.

VEGETATION

The Monument is located within the Columbia Basin Ecoregion (DOE-RL 1996: Appendix C), an area that historically included over 14.8 million acres (6 million ha) of steppe and shrub-steppe vegetation across most of central and southeastern Washington State (Franklin and Dyrness 1973) as well as portions of north-central Oregon. native, pre-settlement vegetation consisted primarily of shrubs, perennial bunchgrasses, a variety of forbs and a living soil crust composed of lichens, moss and algae. The State of Washington has designated shrub-steppe communities as a priority habitat because of their significance to a number of wildlife species and the scarcity of this habitat type (WDFW 1996). In addition, the U.S. Department of the Interior (DOI) has identified native shrub and grassland steppe in Washington and Oregon as an endangered ecosystem (DOI 1995).

Native Grassland and Shrub-steppe

A number of different plant association zones occur as climatic climaxes (*i.e.*, the plant association or community expected to occur in typical sites in the absence of disturbance) throughout the Columbia Basin Ecoregion. The

largest and driest of these zones (about 8.2 million acres [3.3 million ha]) is the big sagebrush (*Artemisia tridentata*) / bluebunch wheatgrass (*Pseudoroegneria spicata* [=*Agropyron spicatum*]) association. This association occupies the center of the Columbia Basin Ecoregion, which includes the Hanford Site. In general, the big sagebrush / bluebunch wheatgrass association is characterized by four layers of vegetation: an overstory layer composed mostly of big sagebrush up to two meters tall, a tall understory layer of bluebunch wheatgrass, a short understory dominated by Sandberg's bluegrass (*Poa sandbergii* [included within *Poa secunda*]), and a layer of algae, lichens and mosses on the soil surface (i.e., the microbiotic crust). The microbiotic crust is a critical component of native grasslands and shrub-steppe communities. This diminutive community of mosses, lichens, liverworts, algae, and bacteria stabilizes the soils and fills the interstitial space between bunchgrass clumps. Perennial forbs are a minor constituent of the tall understory layer, whereas most annual forbs occur in the short understory layer. Other shrubs that may be present include rabbitbrush (*Chrysothamnus* spp.), bitterbrush (*Purshia tridentata*), spiny hopsage (*Grayia spinosa*), and three-tip sagebrush (*Artemisia tripartita*). Additional locally abundant bunchgrasses include needle-and-thread (*Stipa comata*), Indian ricegrass (*Oryzopsis hymenoides*), Cusick's bluegrass (*Poa cusickii* [included within *Poa secunda*]) and Idaho fescue (*Festuca idahoensis*). Other associations, such as big sagebrush / Idaho fescue, bluebunch wheatgrass / Sandberg's bluegrass, and bluebunch wheatgrass / Idaho fescue can occur as topographic climaxes on moister sites within the big sagebrush / bluebunch wheatgrass association. Certain edaphic (soil-related) plant associations also are of ecological importance within the ecoregion. On deep soils dominated by gravel, sand, or strongly weathered volcanic ash, needle-and-thread and/or Indian ricegrass replaces bluebunch wheatgrass as the dominant grass in several associations. The dominant shrub in these associations can be either big or three-tip sagebrush or bitterbrush. On stony soils or extremely shallow soils over bedrock (lithosols), various species of buckwheat (*Eriogonum*) and/or stiff sage (*Artemisia rigida*) dominate the shrub layer and Sandberg's bluegrass dominates the understory. As the hottest, driest, and lowest elevation part of the ecoregion, the Hanford Site also possesses a series of three plant associations found on reasonably deep, loamy (but dry) soils. These are the big sagebrush / Sandberg's bluegrass, spiny hopsage / Sandberg's bluegrass, and winterfat (*Atoides* [=*Eurotia*] *lanata*) / Sandberg's bluegrass associations. Each of these associations is characterized by the lack of large, perennial bunchgrasses (Sandberg's bluegrass is relatively small) and low overall plant diversity.

Riparian areas

Riparian vegetation of the Mounument is limited to portions of the Columbia River shoreline, islands and sloughs, a few natural desert springs, and ponds, lakes, and wetlands created by irrigation run off. In a dry, cold-desert environment, riparian areas are extremely valuable. Because of their direct association with water, plant diversity and structure is increased, consequently, the value of these communities as wildlife habitat is very high. Although these areas are small in acreage, riparian zones are a very important component of the Monument. These sites are important because the lush riparian habitat sharply contrasts with the surrounding dry shrub-steppe and provides trees and larger shrubs not available elsewhere on the Monument. Riparian areas are characterized by diverse shrubs and trees that include a substantial component of, or dominance by willow (S*alix*) species. Other trees include black cottonwood (*Populus trichocarpa*), black locust (*Robinia psuedo-acacia*), and quaking aspen (*P. tremuloides)*. Shrubs include several willow species (*Salix* spp.), mock-orange (*Philadelphus lewsii*), golden currant (*Ribes aureum*), Wood's rose (*Rosa woodsii*), blue elderberry (*Sambucus ceruleus*), chokecherry (*Prunus virginiana*), sumac (*Rhus glabra*), and red-osier dogwood (*Cornus stolonifera*) and western virginbower (*Clematis ligusticifolia)*. Watercress (*Rorripa nasturtium-aquaticum*), stinging nettle (*Urtica dioica*), water speedwell (*Veronica anagallis-aquatica*), rushes (*Juncus* spp.), bulrush (*Scirpus* spp.), and spike rush (*Eleocharis* spp.) are common herbaceous species. The "artificial" wetland areas have a larger component of non-native species such as

Russian olive (*Elaeagnus angustfolia*), and tamarisk (*Tamarix parviflora*), but also support native willows (common cattail (*Typhus* sp.) and black cottonwoood.

Disturbed Vegetation/Invasive species

Prior to alteration of the shrub-steppe of eastern Washington in the 1800's, big sagebrush/bluebunch wheatgrass was the dominant vegetation type over much of the Columbia Basin (Daubenmire 1970). Although the Monument area has documented large, relatively undisturbed shrub-steppe plant communities as described above, many previously disturbed areas have altered vegetative communities. One of the primary significant changes to the vegetative communities is the invasion of non-native plant species. Once introduced, these species can proliferate because of the lack of natural predators or because they can out-compete native plant species in disturbed habitats. Moreover, some species are aggressive enough to be successful in invading even intact native plant communities. Disturbed areas of the Monument units usually are dominated by cheatgrass and other exotic species cover with or without big sagebrush. Cheatgrass is a particularly competitive plant that favors disturbed areas, and has several characteristics that enhance its ability to establish and persist, including the ability to germinate in the spring or fall, high seed production, greater germinability than native grasses, and tolerance to grazing. Within several areas the native vegetation has likely been permanently replaced by cheatgrass and other non-native plants, particularly in areas where historic disturbances were the most intense (especially on historically farmed and grazed locations). Vegetation within these areas have highly variable shrub cover, high cover of cheatgrass, frequently a significant cover of Sandberg's bluegrass, and usually a low cover of microbiotic crust. It is unlikely that native bunchgrasses will become established without extensive restoration. Additionally, noxious weeds, and other aggressive non-native plants tend to invade, and become established more readily within previously disturbed habitats. The invasion of non-native plants represents a threat to the integrity of the Monument, and the preservation of it's unique biodiversity.

Rare Plants

A total of 127 populations of 30 rare plant taxa have been documented to occur on the Hanford Site. A majority of these populations and taxa occur on the Monument. In addition, 3 taxa (two species and one variety) had not previously been described and are considered "new" to science; *Eriogonum codium* (Umtanum Ridge desert buckwheat), *Lesqurella tuplashensis* (White Bluffs bladder-pod), and *Astragalus comjunctus* var. *rickardii.* (Rattlesnake mountain milk-vetch). Many of these populations of plants are endemic to the area, several were not previously known from Washington State, or otherwise of botanical interest and potentially of conservation and management concern. Little is known about the ecology, requirements or population dynamics of these species. Fire may be one of the greatest threats to many of these plants, mortality of Umtanum Ridge desert buckwheat was documented following a 1997 fire.

FISH AND WILDLIFE

The diversity of habitats across the Monument support a diverse assemblage of wildlife species. The shrub-steppe ecosystem supports an unusually high diversity of native plant and animal species, including significant breeding populations of nearly all steppe and shrub-steppe dependent wildlife. Mature sagebrush/bunch grass and riparian areas are of particular importance for wildlife. The sagebrush is either a food source or provides nesting, resting, thermal and escape cover for a wide variety of species. Other value for wildlife includes the thick canopy which protects under story vegetation (forbs) that can be a valuable food source for wildlife. Riparian areas provide structure and diversity critical for nesting, resting thermal and escape cover, as well as abundant water. Numerous wildlife species depend upon the Monument's intact ecosystems; 43 species of fish, including threatened and

endangered salmon and trout; 40 mammals; 246 birds; 4 amphibians; 11 reptiles and over 1500 invertebrates have been documented on the Monument.

Fish

The monument/refuge includes the Hanford Reach; the nation's last, non-tidal, free-flowing segment of the Columbia River. Forty three species of fish have been documented as occurring in the Hanford Reach. Salmonids are of particular interest, large numbers of fall chinook salmon *(Onchorynchus tshawytscha*) spawn in the Hanford Reach, Upper Columbia River Spring Chinook (*Onchorynchus tshawytscha*), listed as a federally threatened species, also uses the Hanford Reach for migration, as well as both the Middle Columbia River Steelhead (*Onchorynchus mykiss*) and Upper Columbia River Steelhead (*Onchorynchus mykiss*) both of which are federally threatened species. Beach seine catches from April-June in the Hanford Reach are dominated by subyearling fall chinook salmon (USGS, unpublished data). Other numerically important species during this time are redside shiners, carp, largescale suckers, northern pikeminnow, and peamouth. Mountain whitefish are common in the Hanford Reach and support a recreational fishery. Centrarchids and percids are more common in McNary Reservoir, although smallmouth bass are also abundant in the Hanford Reach. Tench, threespine sticklebacks, and mountain whitefish are rarely captured in Hanford beach seining activities. The ponds and lakes created by irrigation run-off also have populations of introduced fishes such as carp, bass, sunfish, and panfish. Riparian vegetation and backwater sloughs are very important for fisheries habitat. Shoreline vegetation provides shade, moderates temperatures in shallow water and provides shelter and substrate for invertebrate populations all of which are critical for sustaining fish populations. Occasionally, vegetation may become dense and limit open water habitat.

Wildlife

Shrub-steppe obligates

The Proclamation establishing the monument directs the FWS to manage the monument to protect all of the species associated with the shrub-steppe ecosystem. A primary objective of the FWS is to ensure that the area is operated and managed for the protection and preservation of the native shrub-steppe habitat and its associated wildlife species. Wildlife species that are dependent on sagebrush and are considered shrub-steppe obligates in the Columbia Basin Ecoregion include: Ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), sage sparrow (*Amphispiza belli*), Brewer's sparrow (*Spizella breweri*), sage thrasher (*Oreoscoptes montanus*), greater sage grouse (*Centrocercus urophasianus*), long-billed curlew (*Numenius americanus*), sagebrush vole (*Lagurus curtatus*), Merriam's shrew (*Sorex merriami*), pygmy rabbit (*Brachylagus idahoensis*), Washington ground squirrel (*Spermophilus washingtoni*), black tailed jack-rabbit (*Lepus californicus*), sagebrush lizard (*Sceloporus graciosus*) and striped whipsnake (*Masticophis taeniatus*). Management to maintain and enhance habitat for these species is and will be a priority throughout the monument/refuge. Little is known about the habitat needs of many of these species, so that protection and preservation of intact areas is paramount.

Mammals

The most abundant mammal of shrub-steppe habitat of the Monument is the Great Basin pocket mouse (*Perognathus parvus*). The deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), northern grasshopper mouse (*Onychomys leucogaster*), bushytail woodrat (*Neotoma cinerea*), and northern pocket gopher (*Thomomys talpoides*) are other common small mammals using habitats on the ALE

Reserve. Least chipmunks (*Eutamius minimus*) are found in the upper elevations of Rattlesnake Mountain, and sagebrush voles are relatively common above 1,000 feet (305 m) elevation in sagebrush habitat.

Porcupines (*Erethizon dorsatum*) are typically restricted to riparian areas where they feed on the bark of small limbs and tree branches. Black-tailed jackrabbits (*Lepus californicus*) are usually common in mature sagebrush habitat. White-tailed jackrabbits *(L. townsendi*) occur in sagebrush/bunchgrass habitats, generally at higher elevations than black-tailed jackrabbits. The populations of both species are cyclical and are currently at low levels throughout the Columbia Basin.

Large mammals found on the ALE Reserve include the occasional cougar *(Felis concolor*), bobcat (*Felis rufus*), and badger (*Taxidea taxus*). These species are present throughout the Hanford Site in low numbers. A resident Elk (*Cervus elaphus*) herd uses the ALE site portion of the National Monument. Mule deer (*Odocoileus hemionus*) densities on the ALE Reserve and along the Columbia River are the highest among Hanford habitats. Coyotes (*Canis latrans*) are the most abundant large carnivore on the Monument.

The lack of sufficient roost habitat probably limits the density and diversity of bats on the Monument. Bats may be more common in areas adjacent to the Columbia River and in riparian zones around desert springs and lakes created by irrigation return. Studies in the general Hanford vicinity have documented the presence of pallid bat (*Antrozous pallidus*), silver-haired bat (*Lasionycteris noctivangans*), and western small-footed myotis (*Myotis ciliolabrum*). The extent to which these species use the Monument is not known.

Birds

Approximately 238 species of birds have been documented on or near the Monument, 36 of which are common and 40 are accidental visitors. The Monument provides habitat for year-round residents, migratory species that breed on the site, winter residents, and migrants that are passing through to or from breeding grounds.

Mature sagebrush stands are perhaps the most important habitat on the National Monument because large blocks of sagebrush in good condition are a dwindling resource in the Columbia Basin Ecoregion. Horned lark (*Eremophila alpestris*) and meadowlark (*Sturnella neglecta*) are the most abundant breeding birds in the sagebrush/bunchgrass habitats. Brewer's sparrow is more common in the three-tip sagebrush communities at higher elevations. The Brewer's sparrow and sage sparrow are sagebrush obligates and require sagebrush stands for nesting. Other species closely tied to sagebrush occurrence include loggerhead shrike and sage thrashers. Loggerhead shrikes are commonly observed in dense sagebrush stands of the Monument.

The large expanses of bunchgrass habitat on the Monument provide hunting, nesting, and resting areas a number of bird species. Native bunchgrass habitat is used for foraging by a variety of raptors including Swainson's hawk (*Buteo swainsoni*), golden eagles (*Aquila chrysaetos*), prairie falcons (*Falco mexicanus*), short-eared owls (*Asio flammeus*), and red-tailed hawks (*Buteo jamaicensis*), among others. Meadowlarks, horned lark, and grasshopper sparrow (*Ammodramus savannarum*) are some of the ground-nesting birds that are commonly found in bunchgrass habitat on the ALE Reserve. Burrowing owls (*Athene cunicularia*) and Swainson's hawks also have been documented nesting and feeding in bunchgrass habitat.

Riparian habitat is a scarce but important resource for birds on the National Monument. The sharp contrast with the adjacent shrub-steppe habitat, the presence of trees, and the abundant cover make these areas focal points for predator and prey. Although the total area occupied by riparian habitat is small, the avian diversity is higher than the surrounding shrub-steppe. Riparian habitats are used by neotropical migrants such as, the western wood pewee (*Contopus sordidulus*), Say's phoebe (*Sayornis saya*), western kingbird (*Tyrannus verticalis*), and resident downy woodpeckers (*Picoides pubescens*), and northern flickers (*Colaptes auratus*). Trees are rare on the Monument landscape and therefore provide an important resource for a number of birds. Raptors will perch, hunt from, or nest in trees in the riparian zone, or they may be attracted by the presence of prey species. The barn owl (*Tyto alba*), long-eared owl (*Asio otus*), great-horned owl (*Bubo virginianus*), red-tailed hawk, sharp-shinned hawk (*Accipiter striatus*), American kestrel (*Falco sparverius*), and Swainson's hawk regularly use riparian zones. Chuckar (*Alectoris chukar*), California quail (*Callipepla californica*), and mourning dove (*Zenaida macroura*) find abundant cover from predators in the riparian zones. Red-winged (*Ageliaus phoeniceus*) and Yellow-headed blackbirds (*Xanthocephalus xanthocephalus*) breed along watercourses. Songbirds documented using the Monument riparian zones include the ruby-crowned kinglet (*Regulus calendula*) and golden-crowned kinglet (*R. satrapa*), warbling vireo (*Vireo gilvus*), orange-crowned warbler (*Vermivora celata*), yellow-rumped warbler (*Dendroica coronata*), MacGillivray's warbler (*Oporornis tolmiei*), and Wilson's warbler (*Wilsonia pusilla*), among others. In the winter, riparian zones are used by dark-eyed junco (*Junco hyemalis*), white-crowned sparrow (*Zonotrichia leucophrys*), American robin (*Turdus migratorius*), Townsend's solitaire (*Myadestes townsendi*), and other species (LaFramboise and LaFramboise 1998).

Riverine habitat along the the Hanford Reach is used extensively by Mallards (*Anas platyrhynchos*), Canada geese (*Branta canadensis*) and other waterfowl for wintering, and the island habitats for nesting. Great Blue herons (*Ardea herodias*), Great Egrets (*Ardea alba*), Black-crowned night-herons (*Nycticorax nycticorax*), and other water-related birds have also been noted using the river corridor and islands. Double crested cormorants (*Phalacrocorax auritus*), American white pelicans (*Pelecanus erythrorhynchos*), several species of gulls and terns also use these areas.

Amphibians and Reptiles

Limited surveys recently documented a number of common amphibians and reptiles on the Monument. Species recorded on the include the Great Basin spadefoot toad *(Scaphiopus intermontanus*), Woodhouse's toad (*Bufo woodhousei*), Tiger salamander (*Ambystoma tigrinum*), Pacific treefrog (*Hyla regilla*), Painted turtle (*Chrysemys picta*), short-horned lizard (*Phynosoma douglassi*), sagebrush lizard (*Sceloporus graciosus*), side-bloched lizard (*Uta stansburiana*), racer (*Coluber constrictor*), gopher snake (*Pituophis melanoleucus*), common garter snake (*Thamnophis sirtalis*), western terristrial garter snake (*Thamnophis elegans*) night snake (*Hypsiglena torquata*), striped whipsnake and western rattlesnake (*Crotalus viridis*). Bullfrog (*Rana catesbeiana*), an introduced exotic species, were also documented on the Monument.

Invertebrates

The diversity of insect life on the Monument is very high; over 1500 species have been documented. Darkling beetles (family *Tenebrionidae*) are some of the more conspicuous ground-dwelling insects on the Hanford Site, including the Monument. These beetles play an important role in the nutrient cycling in shrub-steppe communities and are prey for a variety of mammals. Darkling beetles are generally more abundant in warmer and drier locations and in areas dominated by native vegetation, and thus may be a good indicator of change in shrub-steppe habitats.

The ALE Reserve is particularly rich in butterflies and moths; 46 butterfly species and 107 moth taxa have been identified. Umtanum Ridge, Rattlesnake Ridge, and the shorelines of the Columbia River appear to support a wide variety of butterflies, including several rare species. An alkaline spring on Umtanum Ridge supports an endemic snail not known from any other location. Most insects are associated with specific microhabitats or host plants, are short-lived, and travel only short distances during their life. Unlike birds and mammals that may colonize an area if suitable habitat develops, the ability of insects to re-invade sites is minimal. Preservation of the variety of habitats available throughout the Monument is therefore particularly important for invertebrate conservation.

AIR QUALITY

The monument/refuge is located within a Class II air quality area as specified by the Clean Air Act. Air quality in the monument/refuge is well within federal and state standards for criteria pollutants, except that short-term particulate concentrations occasionally exceed the 24-hour standard for particulate matter. Dust storms can create serious visibility problems on highways and other roads within the monument/refuge. Winds capable of moving sand-sized particles occur approximately 40 days per year. An average of eight dust storms a year that decrease visibility to below 10 km (6.2 mi) occur at the Hanford Meteorology Station (U.S. Department of Energy, 1998). Dust storms occur most frequently from March through May and also in September. Wind-blown dust, or "rural fugitive dust" is generally exempt from U.S. Environmental Protection Agency (EPA) regulations.

Outdoor burning permits are issued by the Washington State Department of Ecology in Franklin and Grant counties, and by the Benton Clean Air Authority in Benton County.

WATER RESOURCES

Primary natural surface water features within the monument/refuge include the Hanford Reach of the Columbia River and Snively and Rattlesnake springs; two major spring systems with short stream segments located on the ALE. The Snively and Rattlesnake spring systems provide important aquatic and riparian habitats in an otherwise arid landscape. A number of intermittent natural springs and streams originate on the flanks of Rattlesnake and Saddle Mountains.

Several irrigation canals, part of the Bureau of Reclamation's Columbia Basin Irrigation Project, form artificial lakes (Saddle Mountain lakes), ponds (WB-10 ponds) and associated wetland areas in the Saddle Mountain and Wahluke Units.

The Columbia River within the Hanford Site is unique within the post-dam Columbia River system in the United States. As opposed to the rest of the river system which is a series of slack-water reservoirs formed by dams; here, the river runs freely through an approximately 51-mile segment extending from the upper end of McNary Dam Reservoir to Priest Rapids Dam. Although overall flow volume and corresponding water levels are controlled by upstream dams, the Reach itself remains essentially free-flowing. As such, it contains significant riparian habitat, islands, riffles, gravel bars, oxbow ponds, and backwater sloughs, which are otherwise rare within the Columbia River system (USFWS 1980, NPS 1994). These once common habitats now provide remnant habitat for aquatic organisms, including salmon that were widespread before the remainder of the Columbia River system was converted to reservoir or slack-water habitat. There are no perennial streams originating from the monument/refuge that feed the Columbia River.

SOILS

Located within the Columbia River Plain, the monument/refuge is underlaid with Columbia River Basalt, a result of lava flows occurring roughly between 17 and 2 million years ago. Massive flood events (The Missoula Floods) occurred periodically towards the end of the Pleistocene epoch; until roughly 12,000 years ago.

Soils on the monument/refuge vary from wind-carried sand and sandy loam to silt, with 15 types in all described (Hajek 1966). The silt loam soils tend to be found on the slopes and higher elevation areas, whereas sandier soils are found at the lower elevations of the Columbia River Plain. Large, active dune fields occur on both sides of the river.

Throughout much of the monument/refuge, a living crust covers some or all of the soil between plants (Nash, 1996a.b). The soil crust - referred to as microbiotic, cryptobiotic, or

cryptogamic - is composed of algae, fungi, lichens, and mosses. Microbiotic soil

crusts are especially well developed in relatively undisturbed areas of the monument/refuge. Although the ecological role of the microbiotic crust is not completely understood, it is thought to play an important role in ecosystem functioning. Microbiotic crusts can stabilize the soil, thus reducing wind and water erosion (Metting 1991; Johansen 1993; Eldridge and Greene 1994). Some crust organisms contribute nitrogen (Harper and Pendleton 1993) and organic carbon (Johansen et al.1993) to the soil. Some researchers have found an increase in the infiltration of precipitation into the soil with microbiotic soil crusts (Brotherson and Rushforth, 1983). Intact crusts can also enhance native seedling establishment in arid ecosystems (St. Clair et al. 1984), and may discourage invasion by non-native species such as cheatgrass.

Erosion is a major concern on the monument/refuge where disturbance has occurred along roadbeds, powerline corridors, and severely burned areas. High-intensity fires that remove the shrub, herbaceous and microbiotic crust cover from the soil can experience substantial soil loss through wind erosion and spring melt events.

CULTURAL RESOURCES

The monument/refuge contains extensive, well-preserved archaeological deposits left by more than 10,000 years of human activity. This area retains traditional cultural significance to members of the Yakama, Umatilla, Nex Perce, and Colville Tribes, and the Wanapum People. Their ancestors resided on the land and used its resources and their past and present culture is tied closely with the landscape. Numerous archaeological sites have been recorded within the monument/refuge, with documentation secured at the Pacific Northwest National Laboratory and FWS monument/refuge headquarters.

Euro-Americans first visited the region with the Lewis and Clark expedition, followed by fur trappers, military units, miners, and settlers. By 1880, cattle ranches and farms were established on lands currently within the monument/refuge. The federal government acquired 1,517 square km (586 square miles) for the Hanford Engineer Works in 1943, evacuating all citizens and razing most structures. Still, historic sites have been documented throughout the monument/refuge, including the White Bluffs log cabin and ferry landing, natural gas exploration wells, mine tailings, remnants of homesteads and agricultural structures, and historic trash scatters. More recent historic sites on the monument/refuge include structures and facilities associated with Cold War activities.

RECREATION RESOURCES

Located with one-half day's drive of more than four million people, the monument/refuge provides locally and regionally significant semi-primitive opportunities for fishing, hunting, wildlife observation, photography, environmental education, and motorized and non-motorized boating. Visitors may access over 57,000 acres located on the Wahluke Unit, and over 50 miles of river along the free-flowing Hanford Reach of the Columbia River. The scenery, wildlife, and seasonal opportunities for solitude contribute to the high quality of the experience in this area. Current visitor facilities consist of access roads, parking areas and primitive boat launches in the Wahluke Unit.

Anglers from throughout the Pacific Northwest visit the Hanford Reach for the smallmouth bass, sturgeon, steelhead, and fall chinook salmon sport fisheries. The largest remaining wild fall chinook salmon spawning area in the Pacific Northwest; an internationally significant resource; is found within the Hanford Reach. The heaviest recreation use period on the monument/refuge occurs in September and October during the fall chinook runs.

The Hanford Reach offers excellent opportunities for waterfowl hunting during the fall and winter months. The Wahluke Unit is locally popular for upland bird and deer hunting.

The Hanford Reach and Wahluke Unit offer some of the best opportunities for wildlife observation in eastern Washington State. Bald eagles, common loons, white pelicans, terns, gulls, great blue and night-crowned herons, mule and white tailed deer, coyotes, porcupines and beavers are commonly observed. Outstanding opportunities for birding are available on the Wahluke Unit, especially during spring's influx of migratory song-birds. Showy wildflower displays attract onlookers and botanists each spring.

The Hanford Reach was found suitable for Recreational River designation under the Wild and Scenic Rivers Act (Hanford Reach of the Columbia River Conservation Study and EIS, 1994). This river segment is under interim protection status through Public Law (PL) 100-605, as amended by Section 404 of PL104-333. Interim protection is administered by the FWS.

VISUAL RESOURCES

The landscape setting within the monument/refuge is characterized by broad basins and flat plateaus interspersed with ridges, providing wide, open vistas throughout much of the area. The majority of the area is undeveloped, although the presence of roads and highways, fences, small buildings, power lines, and irrigation canals are visible in much of the area. Outstanding scenic resources include Rattlesnake Mountain, the Saddle Mountain range, the Columbia River, the White Bluffs geologic formation, sand dunes, and the unbroken expanses of shrub-steppe vegetation communities. Shrub-steppe vegetation communities constitute the region's historic landscape, and the monument/refuge provides excellent examples of the landscape witnessed by post-European explorers Lewis and Clark. Shrub-steppe vegetation communities are characterized by overstories consisting of sagebrush, bitterbrush, black greasewood, spiny hopsage, and rabbit brush, interspersed by perennial bunchgrasses and forbs. Spectacular wildflower displays are evident throughout the area each spring. Portions of the monument/refuge that have incurred surface disturbance are dominated by non-native plant communities such as cheatgrass, knapweed, thistle and skeletonweed. These monotypic plant communities appear markedly different from the historic landscape, and are undesirable from a visual resource perspective.

CONSEQUENCES OF THE PROPOSED AND ALTERNATIVE ACTIONS

The following Critical Elements of the Human Environment have been considered and would not be affected by the proposed action: Environmental Justice; Farm Lands (Prime or Unique); Floodplain; Native American Religious Concerns; Native American Trust Assets, Wastes, Hazardous or Solid; and designated Wilderness.

Full suppression of all wildland fires would occur under all alternatives. Impacts associated with full suppression would vary with the different fuel loads associated with each alternative.

FUELS

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Implementing this alternative would allow for operations at the monument/refuge to continue status quo, including the continuation of prescribed fires on the Saddle Mountain Unit. Hazardous fuels would continue to accumulate, leading to an increased potential of large, high-intensity wildland fires. Control capabilities may be compromised or exceeded, and suppression expenses increased. The potential of threat to life and property would rise. Ecological degradation that would both eliminate shrubs and increase non-native plants would continue.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

Implementing this alternative would allow the use of the combination of mechanical fuel manipulation and prescribed burning. Using these management tools would reduce fuels and minimize large, potentially catastrophic fires. Prescribed fires do provide short-term risk of escape in areas where fuel loads are high.

Alternative C: Full Suppression, Mechanical Treatment, No Prescribed Fire

Implementing this alternative would allow for mechanical treatment of fuels, but no prescribed fires. Mechanical manipulation would allow stacking, piling and re-arrangement of fuels on the landscape. This would reduce the ability of fires to spread, but the remaining large piles could create pockets of high intensity fires. Mechanical treatments would not be possible in many areas due to sensitive cultural and natural resources that would be affected by heavy equipment. Hazardous fuels would continue to accumulate, leading to an increased potential of large, high-intensity wildland fires. Control capabilities may be compromised or exceeded, and suppression expenses increased. The potential of threat to life and property would rise. This could lead to large destructive fires in biologically and culturally sensitive areas.

Alternative D: Full Suppression, No Mechanical Treatment, No Prescribed fire

Implementing this alternative would allow wildland fires to be suppressed, but would eliminate the use of either mechanical treatment or prescribed fire. Hazardous fuels would continue to accumulate, leading to an increased potential of large, high-intensity wildland fires. Control capabilities may be compromised or exceeded, and suppression expenses increased. The potential of threat to life and property would rise. Ecological degradation that would both eliminate shrubs and increase non-native plants would continue.

VEGETATION

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Under the No Action alternative all wildland fires will be suppresses and vegetation could be mechanically manipulated and prescribed fire used on the Saddle Mountain Unit.

Effects of fire on vegetation are directly related to the type of vegetation and the fire behavior exhibited by the fire. Fire intensity, temperature, flame length, duration, time of day, and season influence fire impact. Fire might kill or damage individual plants but many plants would survive through various fire adaptations. Invasive species often increase following disturbance and out-compete native plants. The presence of non-native invasive plants has altered the ability of many plant communities to progress through a natural succession process following disturbance such as fire.

High-intensity fires cause high mortality of overstory shrubs, and can potentially increase mortality and significantly reduce the abundance and diversity of native plants. Additionally, native seed banks can potentially be destroyed by high intensity fires. This type of disturbance can make native habitat vulnerable to invasion by cheatgrass and other non-native plants. Cheatgrass can out compete native plants because of it's rapid seed dispersal, it's ability to germinate in the early winter before native plants, and because it is well adapted to repeated high intensity fires. Natural re-vegetation of burned areas has been altered with the invasion of cheatgrass. Normal succession of plant communities in areas dominated by cheat grass does not occur. This can cause permanent changes to the plant community and to ecosystem function.

Even in predominantly native plant communities, it may take many growing seasons for the plant structure and diversity to recover following a high intensity fire. Native grasses take a minimum of 3-5 years and may take as long as 10 years to recover to their pre-fire structure, depending on soil types. Shrubs may take at least 10-15 years and perhaps as long as 50 years to recover their size and structure, depending on soil types. If shrub recovery is left up to natural succession, without rehabilitation efforts, shrubs may take centuries to re-invade over large fire areas. Sagebrush, for example, only reproduces by seed following fire and seeds from reproductive plants do not fall far from the parent plant. Seeds can spread small distances by wind. Little is known about how fire effects microbiotic crust species, and how long it might take to re-establish the crust layer following fire.

Suppressing all wildland fires would benefit native vegetative communities by decreasing the acreage of the fire. Minimizing wildland fire acres burned will protect fire intolerant species of shrubs and allow their development. Sagebrush will be allowed to grow into an overstory plant in areas where repeated fires have eliminated the shrub component of the vegetative community. Mechanical treatments could be conducted to install fire breaks and prevent fires in the Saddle Mountain Unit. Preventing fires will help to restore the natural fire regime to the area by extending the amount of time between fires.

Prescribed fires could be used to prevent destructive wildland fires by reducing fuels in native communities during seasons of the year when burns would be low intensity. Also, prescribed fire could be used in areas to prepare them for restoration of native vegetation.

This Alternative provides limited ability to address accumulation of fuels, and may lead to catastrophic, destructive fires. Mechanical methods could be used to address some of the fuel concerns, but only on the Saddle Mountain Unit. Higher intensity fires would invariably occur due to increased fuel loads in all other areas.

Suppression activities may result in direct destruction of vegetation from firelines, helispot construction and other activities. These activities would impact cryptogamic layers through compaction and unearthing of these diminutive soil associated communities. Suppression activities will also have localized effects on plants, through compaction and unearthing. All disturbed areas have the potential for introduction and establishment of non-native plants. Because of this potential, the impacts from suppression activities could be more wide spread than localized, if areas are not rehabilitated following fire fighting activities.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

Under this alternative, suppression would be conducted on wildland fires, vegetation could be mechanically manipulated and prescribed fire could be used on all areas of the monument/refuge. This alternative would expand the ability to manage fire for many purposes including; reestablishment of the natural fire regime, reduction of hazardous fuels accumulation, maintenance of fire breaks, management of exotic vegetation, restoration of native communities, and improvements to wildlife habitat. Implementing a combination of suppression, controlled fire, and mechanical methods will allow for the greatest flexibility in vegetation and habitat management.

Effects of fire on vegetation are directly related to the type of vegetation and the fire behavior exhibited by the fire. Fire intensity, temperature, flame length, duration, time of day, and season influence fire impact. Fire might kill or damage individual plants but many plants would survive through various fire adaptations. Invasive species often increase following disturbance and out-compete native plants. The presence of non-native invasive plants has altered the ability of many plant communities to progress through a natural succession process following disturbance such as fire.

High-intensity fires cause high mortality of overstory shrubs, and can potentially increase mortality and significantly reduce the abundance and diversity of native plants. Additionally, native seed banks can potentially be destroyed by high intensity fires. This type of disturbance can make native habitat vulnerable to invasion by cheatgrass and other non-native plants. Cheatgrass can out compete native plants because of it's rapid seed dispersal, it's ability to germinate in the early winter before native plants, and because it is well adapted to repeated high intensity fires. Natural re-vegetation of burned areas has been altered with the invasion of cheatgrass. Normal succession of plant communities in areas dominated by cheat grass does not occur. This can cause permanent changes to the plant community and to ecosystem function.

Even in predominantly native plant communities, it may take many growing seasons for the plant structure and diversity to recover following a high intensity fire. Native grasses take a minimum of 3-5 years and may take as long as 10 years to recover to their pre-fire structure, depending on soil types. Shrubs may take at least 10-15 years and perhaps as long as 50 years to recover their size and structure, depending on soil types. If shrub recovery is left up to natural succession, without rehabilitation efforts, shrubs may take centuries to re-invade over large fire areas. Sagebrush, for example, only reproduces by seed following fire and seeds from reproductive plants do not

fall far from the parent plant. Seeds can spread small distances by wind. Little is known about how fire effects microbiotic crust species, and how long it might take to re-establish the crust layer following fire.

Suppressing all wildland fires would benefit native vegetative communities by decreasing the acreage of the fire. Minimizing wildland fire acres burned will protect fire intolerant species of shrubs and allow their development. Sagebrush will be allowed to grow into an overstory plant in areas where repeated fires have eliminated the shrub component of the vegetative community. Mechanical treatments could be conducted to install fire breaks and prevent fires in the Saddle Mountain Unit. Preventing fires will help to restore the natural fire regime to the area by extending the amount of time between fires.

Suppression activities may result in direct destruction of vegetation from firelines, helispot construction and other activities. These activities would impact cryptogamic layers through compaction and unearthing of these diminutive soil associated communities. Suppression activities will also have localized effects on plants, through compaction and unearthing. All disturbed areas have the potential for introduction and establishment of non-native plants. Because of this potential, the impacts from suppression activities could be more wide spread than localized, if areas are not rehabilitated following fire fighting activities.

Prescribed burns would prevent catastrophic damage to fire tolerant species and would reduce fuel accumulations that could contribute to large and potentially dangerous conflagrations. This would help prevent native vegetation mortality associated with large, uncontrolled wildland fires. Additionally, fire could be used as a tool to reduce populations of non-native, invasive plants, and to prepare areas for restoration to native vegetation.

Prescribed burns, especially for hazard fuel reduction projects, are often conducted during the season best suited to fire control efforts. Burning during these times of year can increase mortality rate of some plant species that are not fire adapted. Thus hazard fuel burning, in some instances, can reduce the biological diversity of an area. However, fuel reduction may limit the mortality to sensitive species that may be at greater risk if fuels remained heavy and contributed to larger more destructive fires.

Preburn preparation of a prescribed burn project might include manual manipulation of fuels prior to ignition. Mechanical manipulation could be used prior to a prescribed burn situation to pile/stack fuels and limit the impacts from prescribed burns. This manipulation might include line preparation using hand tools, wet line, or foam techniques, and the movement of downed fuels to nearby areas where they might be safely ignited. Manual manipulation may include the use of heavy equipment (dozers, front end loaders, etc.), but this use would be limited to non-sensitive sites. Individual burn plans would describe the techniques to be used under different situations.

Alternative C: Full Suppression, Mechanical Treatment, No Prescribed Fire

Under this alternative, suppression and mechanical manipulation would be combined to limit wildland fire and re-distribute fuels. Vegetation would be mechanically treated by piling/stacking to reduce fuel loads. This alternative requires a large investment in labor costs, and would be extremely expensive over the entire Monument. Some vegetation that would benefit from occasionally burning, such as wetland vegetation, or open grasslands would not be exposed to fire, and would therefore be ecologically stressed. Biologically and culturally sensitive areas may not be well managed, because mechanical treatments may not be possible in those areas. This would leave

sensitive areas with heavy fuel loads and would expose them to intense fires. Activities associated with suppression operations would be similar to Alternative A.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

Under this alternative, wildland fires and unpredictable ignitions would continue to occur. Vegetation would continue to be exposed to repeated burning, potentially during the growing season, in many areas. This would limit the regeneration of shrub habitat over large areas, and could negatively affect native plant communities. The inability to address un-natural accumulation of fuels, such as non-native plants, would create areas of high fuels leading to catastrophic, destructive fires. High intensity fires cause high mortality of overstory shrubs, and can potentially increase mortality and significantly reduce the abundance and diversity of native plants. High intensity fires can cause crown mortality, stem mortality, and root mortality. Additionally, native seed banks can potentially be destroyed by high intensity fires. This type of disturbance can make native habitat vulnerable to invasion by cheatgrass and other non-native plants. Cheatgrass can out compete native plants because of it's rapid seed dispersal, it's ability to germinate in the early winter before native plants, and because it is well adapted to repeated high intensity fires. Natural re-vegetation of burned areas has been altered with the invasion of cheatgrass. Normal succession of plant communities in areas dominated by cheat grass does not occur. This can cause permanent changes to the plant community and to ecosystem function. Under this alternative, it is expected that large, wildland fires would continue to repeatedly burn the Monument area, and that ecosystem values would be reduced or lost. Activities associated with suppression operations would be similar to Alternative A.

WILDLIFE

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Wildlife populations would be influenced directly and indirectly by the impacts on associated vegetative communities. Direct effects refer to mortality or disturbance that results in flushing, displacement, harassment or mortality of the animal. Indirect effects refer to modification of habitat and/or effects to prey species. The ability of wildlife to survive a fire depends upon the season, uniformity (or patchiness), severity and intensity of the burn, and the size and duration of the fire, as well as the animal's mobility and habitat use patterns.

Full Suppression of all wildland fires would limit direct effects to wildlife minimizing acres burned.

Indirect effects, the effects associated with changes to habitat must be considered with respect to the analysis of vegetation impacts. Referring to the vegetation section above, under this alternative, shrub-steppe dependant wildlife (see Affected Environment) would benefit from suppression actions that would retain shrub communities on the landscape. Sagebrush is either a food source or provides nesting, resting, thermal and escape cover for a wide variety of species. Other value for wildlife includes the thick canopy which protects understory forbs that can be a valuable food source for wildlife. Minimizing acres burned would help retain vegetation structure, native plant communities and continue to limit the spread of native non-native invasive plants.

There is potential for inadvertent wildlife habitat destruction during suppression activities (e.g., fireline construction). However, the benefit of attempting to protect or prevent larger fires may mitigate the smaller localized habitat alterations needed for suppression efforts. Attempting to keep wildland fires small in size will more closely mimic the historical fire regime.

Limited prescribed fire would benefit habitat on the Saddle Mountain Unit. Habitat could be protected from large, high intensity, high severity burns through the use of mechanical fuels reduction and the use of prescribed fire. Applying prescribed fires allows for greater flexibility in planning for, locating, and avoiding disturbance to wildlife populations. Habitat impacts would be determined by prescribed burn timing, location, conditions, and patterns. This would reduce impacts from unplanned ignitions in these areas.

On the areas of the Monument where there would be no prescribed fire, the increased fuel loads and increased probability of intense wildland fires may lead to increased direct impacts on wildlife and potential fire-caused mortalities. Severe impacts to habitat in areas of high fuel accumulations would also lead to indirect effects on wildlife populations. The displacement of individuals, followed by decreases in productivity, and reduced populations could result from large scale wildland fires. The elimination of shrub-steppe obligate species over large areas could occur with the wide scale elimination of shrub cover. Riparian wildlife would be affected by intense burns in riparian zones, because the structure would no longer be there to support nesting, hiding, roosting, or escape cover. Riparian vegetation also provides shade, temperature moderation, and hiding cover for fish. Removal of this cover could have negative impacts on fish. Alternatively, letting vegetation become too dense in shallow water areas also may cause adverse impacts on fish populations in several areas. Aged, decadent, or even non-native streamside vegetation would continue to alter the structure of riparian zones at alarming rates.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

This alternative would allow greater flexibility in planning for, locating, and avoiding disturbance to wildlife populations. The ability of wildlife to survive a fire depends upon the season, uniformity (or patchiness), severity and intensity of the burn, and the size and duration of the fire, as wells as, the animals mobility, and habitat use patterns. Because burns could be well planned, direct impacts to wildlife could be avoided. Indirect or habitat impacts would be determined by prescribed burn timing, location, conditions, and patterns. In general, all burns would be planned to improve habitat areas for wildlife. Thus, both direct and indirect impacts would be minimized. Considering the large size of the refuge, and the modest proposed prescribed fire program, any impacts to wildlife would be minimal and temporary. No long-term changes in population are anticipated. Using prescribed burning on the Monument would help to protect habitat conditions from large, catastrophic fires that could have long-term, negative effects on wildlife populations.

As in Alternative A, suppression efforts would benefit shrub-steppe obligates by re-establishing a longer fire regime (time between fires) and allowing the development of a shrub overstory in areas where that component of the vegetation has been eliminated through repeated fires. Suppression will also protect riparian areas, and native plant communities. Applying fire in small, controlled burns will allow a mosaic of habitats to develop, and will serve to more closely mimic the historical fire regime.

Mechanically treating excessive fuels, such as non-native plants, will reduce impacts from both prescribed fires and wildland fire. Fuels reduction will promoted less intense burns and will protect wildlife from direct effects of fire, and will reduce the indirect effects on wildlife habitat.

Proper planning and management of prescribed fires would aid in the reduction of ash and other contaminants that might be washed into streams, thereby minimizing impact to fish species. Timing of prescribed burning would be

coordinated to minimize impacts on spawning times for fish species, and also to minimize ground cover loss and the resultant surface washing that may produce contaminates in water resources.

Impacts to the mammals and birds on the federal and state species of concern list should be temporary in nature and minor in intensity. Fire is a natural process and local wildlife evolved in the presence of fire. Mosaic burn patterns will provide refuge for small mammals and will ensure that forage for bat and bird species remains intact.

Alternative C: Full Suppression, Mechanical Treatment, No Prescribed Fire

As in Alternative A and B, suppression efforts on wildland fires would benefit shrub-steppe obligates by re-establishing a longer fire regime (time between fires) and allowing the development of a shrub overstory in areas where that component of the vegetation has been eliminated through repeated fires. Suppression will also protect riparian areas, and native plant communities. However, the inability to apply prescribed fires in a controlled manner would prevent the use of fire to promote ecological function, or to reduce fuels. This would lead to fuel build up (see Vegetation Assessment, Alternative C) and would make large, destructive fires more likely. Consequently wildlife would experience greater negative direct and indirect effects from this alternative.

Mechanical treatments could redistribute fuels away from important wildlife habitat areas, and could be piled or stacked. The exception would be in highly sensitive areas where mechanical treatments could not be used. Mechanical treatments could be timed so that they would not impact animals during important stages of their life cycle (i.e., nesting). These stacks and piles may create an undesirable habitat condition. Stacks and piles may provide un-natural habitat for predators, such as skunks, magpies, etc. which could negatively impact resident wildlife.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

As in Alternative A, B, and C, suppression efforts would benefit shrub-steppe obligates by re-establishing a longer fire regime (time between fires) and allowing the development of a shrub overstory in areas where that component of the vegetation has been eliminated through repeated fires. Suppression will also protect riparian areas, and native plant communities. However, the inability to apply prescribed fires in a controlled manner would prevent the use of fire to promote ecological function, or to reduce fuels. This would increase fuel loads and increase the probability of intense wildland fires, which would lead to increased direct impacts on wildlife and potential fire-caused mortalities. Severe impacts to habitat which would occur in areas of high fuel accumulations would also lead to indirect effects on wildlife populations. The displacement of individuals, followed by decreases in productivity, and reduced populations could result from large scale wildland fires. The elimination of shrub-steppe obligate species over large areas could occur with the wide scale elimination of shrub cover. The conversion of native grassland areas to cheatgrass dominated zones severely impacts the structure and function of the habitat for native wildlife species. For example, native grassland nesting birds have decreased nesting densities in cheatgrass. Cheatgrass also does not produce the same seed crop as native wheat grasses and other bunchgrasses. Small mammals depend on heavy, nutritious sees for survival, particularly over winter, and cheatgrass seeds do not have the same nutrients as native grass seeds. Cheatgrass areas continually have lower abundance and diversity of wildlife species than other native grass, and shrub-steppe communities. Riparian wildlife would be affected by intense burns in riparian zones, because the structure would no longer be there to support nesting, hiding, roosting, or escape cover. Riparian vegetation also provides shade, temperature moderation, and hiding cover for fish. Removal of this cover could have negative impacts on fish. Under this alternative, it is expected that large,

wildland fires would continue to repeatedly burn the monument/refuge, and that ecosystem values would be reduced or lost. Wildlife populations would be reduced across the area.

AIR QUALITY

The effect of smoke from wildland fires will be similar in all alternatives. The amount of smoke and dispersion cannot be controlled in wildland fire situations. Full suppression of all wildland fires should limit smoke emissions by limiting acres burned.

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Local air quality would be adversely affected for short periods of time during prescribed burns in the Saddle Mountain Unit from smoke and particulate matter and post-fire, wind-driven particulate matter. The type and amount of emissions would vary greatly dependent upon fuel moisture, fire intensity and other physical characteristics of the environment. The potential for large, high intensity fires which are difficult to suppress would continue to increase in the monument/refuge outside of the Saddle Mountain Unit, along with increased potential for severe episodes of air pollution and impacts to visibility. With catastrophic fire, decreased air quality effects would occur in the short term, through smoke, and in the long term, from wind-driven particulate matter.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

Local air quality would be adversely affected for short periods of time during prescribed burns through smoke and particulate matter and post-fire, wind-driven particulate matter. Increases in particulate matter would be short-term and localized. The effect of particulate matter and visibility on local communities and commercial establishments would be lessened through the proper use of smoke management and public notification. The controlled nature of prescribed burns makes their effect on air quality significantly less severe than from catastrophic wildland fires. The potential for large, high intensity fires which are difficult to suppress should decrease in the monument/refuge, along with decreased potential for severe episodes of air pollution and impacts to visibility.

Alternative C: Full Suppression, Expanded Mechanical Treatment, No Prescribed Fire

The potential for large, high intensity fires which are difficult to suppress would continue to increase in the monument/refuge along with increased potential for episodes of air pollution and impacts to visibility. Mechanical treatments could be used to redistribute fuels away from roads and thus reduce episodes of decreased visibility from high-intensity fires along travel corridors.

Alternative D: Full Suppression, No Mechanical Treatment, No Prescribed Fire

The potential for large, high intensity fires which are difficult to suppress would continue to increase in the monument/refuge, along with increased potential for episodes of air pollution and impacts to visibility. Decreased air quality effects would be both short term, through smoke, and long term, through wind-driven particulate matter.

WATER RESOURCES

Under all alternatives, full suppression of all wildland fires would maintain the soil's protective cover of vegetation, litter, and microbiotic crust cover; thus benefitting water resources by reducing overland soil erosion.

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Water resources adjacent to the Saddle Mountain Unit would benefit from reduced heavy fuel accumulation through prescribed fire. Reduced fuels lessens the potential for catastrophic fire and subsequent overland soil erosion.

The potential for high-intensity fires outside of the Saddle Mountain Unit would continue to increase due to accumulated fuels resulting from suppression actions. The potential for significant impacts to water resources on the Wahluke and ALE Units through erosion would increase following high-intensity fires and resultant removal of the soil's protective cover of vegetation, litter, and cryptogamic crust.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

Because of the controlled area, timing, and intensity of prescribed burning, water resources should incur little or no long-or short-term changes within the prescribed burn areas. Rehabilitation would minimize erosive effects from fireline construction and other ground disturbing activities. Moderate intensity burns have been shown to aid in increasing grass and forb growth, which would reduce surface runoff. Erosion resulting from this alternative should approximate natural erosion levels.

Alternative C: Full Suppression, Mechanical Treatment, No Prescribed Fire

Implementation of this alternative would increase the potential for high-intensity fires throughout the monument/refuge due to accumulated fuels resulting from suppression actions. Mechanical treatments would be used to limit the intensity of wildland fires and redistribute fuels, but the overall effectiveness of this method is uncertain due to high costs and constraints in sensitive areas. Biologically and culturally sensitive areas may not receive mechanical treatments, leaving these areas with heavy fuel loads and greater potential for catastrophic fires. The potential for significant impacts to water resources through erosion would increase following high-intensity fires and resultant removal of the soil's protective cover of vegetation, litter, and cyrptogamic crust.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

Implementation of this alternative would increase the potential for high-intensity fires throughout the monument/refuge due to accumulated fuels resulting from suppression actions. The potential for significant impacts to water resources through erosion would increase following high-intensity fires and resultant removal of the soil's protective cover of vegetation, litter, and cyrptogamic crust.

SOILS

Under all alternatives, full suppression of all wildland fires should reduce burned acreage in the short term. The soil's protective cover of vegetation, litter, and cryptogamic crust would be maintained; thus benefitting soil resources by reducing erosion. Suppression activities would have some localized impacts to protective cryptogamic crust through compaction and unearthing.

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Long-term impacts of this alternative, with increased potential for catastrophic fire outside the Saddle Mountain Unit, would have overall adverse impacts to soils. Diurnal temperature regimes would be altered from effects of catastrophic fire due to loss of shading and insulating cover. Fire suppression activities could severely impact soils during episodes of catastrophic fire. Some erosive effects would result from the construction of firelines and other ground disturbing activities. Soils stripped of vegetative cover are likely to suffer severe erosion during windstorms and spring melt run-off events.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

Because of the controlled area, timing, and intensity of prescribed burning throughout the management area, impacts to soils should be reduced compared to Alternative A. Erosive effects from fireline construction and mechanical treatment may be mitigated with careful planning. Through prescribed burning, fire intensity is lower and designed to burn in mosaic patterns, which prevents soils from sheet erosion and has the effect of increasing interception of precipitation.

Alternative C: Full Suppression, Mechanical Treatment, No Prescribed Fire

Suppression and mechanical treatment would be combined to limit wildland fire and fuel loading. Vegetation would be mechanically treated by piling/stacking to reduce fuel loads, redistribute fueal and limit the intensity of wildland fires, but the overall effectiveness of this method is uncertain due to high costs and constraints in sensitive areas. In these areas, diurnal temperature regimes would be altered from effects of catastrophic fire due to loss of shading and insulating cover. Fire suppression activities could severely impact soils during episodes of catastrophic fire. Some erosive effects would result from constructing firelines and other ground disturbing activities. Soils stripped of vegetative cover could suffer severe erosion during windstorms and spring melt run-off events.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

Long-term impacts of this alternative, with increased potential for catastrophic fire, would have adverse impacts to soils. Diurnal temperature regimes would be altered from effects of catastrophic fire due to loss of shading and insulating cover. Fire suppression activities might severely impact soils during episodes of catastrophic fire. Some erosive effects would result from fireline construction and other ground disturbing activities. Soils stripped of vegetative cover could suffer severe erosion during windstorms and spring melt run-off events.

CULTURAL RESOURCES

Cultural resources would be protected under all alternatives through the use of low impact wildland fire suppression tactics (e.g. cold-trailing, using water, using natural and manmade barriers, avoiding surface disturbance and high-intensity burning in sensitive areas). Cultural resources would be protected under all alternatives using prescribed fire by designing fire intensity and use of mechanical treatment to minimize impacts.

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Outside of the Saddle Mountain Unit, potential for damage to cultural resources from fire would increase in the long-term. Because of increased potential for catastrophic fire, there would be an increased possibility that

previously unrecorded cultural resources could be damaged or destroyed as a result of fire suppression activities and heat damage.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

With the scheduled nature of burning under this alternative, there would be an ability to plan for, locate, and avoid the disturbance of cultural resources due to either ignition or fire control activities. Dangerous fuel buildups near known resources would be reduced. Cultural features, structures, and other resources would receive increased protection by reducing fuels and fire intensity by conducting controlled burns in appropriate areas.

Alternative C: Full Suppression, Mechanical Treatment, No Prescribed Fire

The potential for damage to cultural resources from fire would increase in the long-term due to the increased potential for catastrophic fire. There would be an increased possibility of destruction of previously unrecorded cultural resources as a result of fire suppression activities, and through heat damage. Culturally sensitive areas may not receive mechanical treatments, leaving these areas with heavy fuel loads and greater potential for catastrophic fires.

Alternative D: Full Suppression, No Prescribed Fire, No Mechanical Treatment

The potential for damage to cultural resources from fire would increase in the long-term due to the increased potential for catastrophic fire. There would be an increased possibility of destruction of previously unrecorded cultural resources as a result of fire suppression activities and through heat damage.

RECREATION RESOURCES

Under all alternatives, full suppression of wildland fires would benefit recreation resources by preventing shrub-steppe habitats from burning, thus retaining the historic landscape and maintaining wildlife populations through habitat protection.

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Prescribed fire would benefit recreation resources indirectly through beneficial impacts to Saddle Mountain wildlife habitat. Essential habitat for rare and declining species could be lost, or removed for several decades following a large fire. Wildlife habitat loss would likely result in declining wildlife populations and related outdoor recreation opportunities such as hunting, wildlife observation and photography would be reduced.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

Prescribed fire would benefit recreation resources indirectly through beneficial impacts to wildlife habitat throughout the monument/refuge. This alternative would allow greater flexibility in protecting wildlife habitat and wildlife populations, with consequent benefits to related outdoor recreation opportunities such as hunting, wildlife observation and photography.

Alternative C: Full Suppression, No Prescribed Fire

Essential habitat for rare and declining species could be lost, or removed for several decades following a large fire. Wildlife habitat loss would likely result in declining wildlife populations and related outdoor recreation opportunities such as hunting, wildlife observation and photography would be reduced.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

Essential habitat for rare and declining species could be lost, or removed for several decades following a large fire. Wildlife habitat loss would likely result in declining wildlife populations and related outdoor recreation opportunities such as hunting, wildlife observation and photography would be reduced.

VISUAL RESOURCES

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Under this alternative, prescribed fires would occur on Saddle Mountain Unit only. Prescribed fires would have short-term impacts to visual resources such as blackened ground, vegetation removal, and air-borne particulate matter. These impacts would be reduced as vegetation is reestablished in the relatively small burned area. Visual resources in other areas of the monument/refuge could be drastically impacted through the greater potential for large, high-intensity fires. Opportunities to control impacts to sensitive visual resources are limited with catastrophic fires. These types of high-intensity fires result in both short-term and long-term impacts to visual resources. Short term effects could include reduced visibility from smoke, post-fire wind erosion causing dust storms, and a short-term black appearance to the landscape. Long-term visual impacts could occur through exotic species invasion and alteration of historic shrub-steppe vegetation communities of burned areas.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

Through the use of prescribed burns, areas with sensitive visual resources could be protected from fire throughout the monument/refuge. Short-term visual effects would consist of scorching of foliage, blackened earth, and airborne particulate matter. Carefully planned prescribed fires would be beneficial to the historic landscape by more closely mimicking the historical fire regime.

The reduced risk of catastrophic fire would in turn reduce the potential of long-term visual resource impacts resulting from soil loss and exotic species invasion.

Alternative C: Full Suppression, Expanded Mechanical Treatment, No Prescribed Fire

Mechanical manipulation would allow stacking, piling and re-arrangement of fuels on the land scape to reduce the ability of fire ignitions to spread, but large piles and stacks would remain. These fuel stacks would be out of character with the historic landscape.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

Visual resources in other areas of the monument/refuge could be drastically impacted through the greater potential for large, high-intensity fires. Opportunities to control impacts to sensitive visual resources are limited with catastrophic fires. These types of high-intensity fires result in both short-term and long-term impacts to visual

resources. Short term effects could include reduced visibility from smoke, post-fire wind erosion causing dust storms, and a short-term black appearance to the landscape. Long-term visual impacts could occur through exotic species invasion and alteration of historic shrub-steppe vegetation communities of burned areas.

SAFETY

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Both wildland and prescribed fires can affect public safety because of smoke. Smoke can obscure visibility affecting transportation. Additionally, smoke can impact people with respiratory problems. Usually, prescribed fires are smaller than wildland fires and generate decreased amounts of smoke. Furthermore, smoke management guidelines require management ignitions to occur when smoke dispersion is favorable.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

Both wildland and prescribed fires can affect public safety because of smoke. Smoke can obscure visibility affecting transportation. Additionally, smoke can impact people with respiratory problems. Usually, prescribed fires are smaller than wildland fires and generate decreased amounts of smoke. Furthermore, smoke management guidelines require management ignitions to occur when smoke dispersion is favorable.

Prescribed burns generally occur under conditions that promote firefighter safety. Because prescribed fires often prevent, or at least reduce the size and intensity of, wildland fires, prescribed fire diminishes firefighter exposure to the dangers of subsequent wildland fires.

Therefore, both alternatives have the same general impact, but B is more desirable than A because both firefighter and public safety are enhanced by increased prescribed burning.

Alternative C: Full Suppression, No Prescribed Fire

This alternative eliminates the exposure of both firefighters and the public to prescribed burning conditions. Although prescribed burning occurs under managed conditions, firefighters are exposed to the hazards of fire during the operation. Since smoke from wildland fires impacts both public transportation and public health, this alternative would diminish the smoke effects if the mechanical treatment is effective.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

Similar to alternative C, this alternative eliminates the exposure of both firefighters and the public to prescribed burning conditions. However, the smoke from wildland fires that impacts both public transportation and public health would increase the smoke effects from this alternative.

OVERALL PROGRAM RISK

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Prescribed fire is used to meet two general objectives: hazard fuel reduction and resource management. The exclusion of prescribed fire on 90% of monument lands results in limitations on meeting these general objectives on a majority of the Monument property. The uneven application of prescribed fire techniques on large sections of the Monument will lead to public misunderstanding of the different strategies on different portions of the landscape. Failure to address hazardous fuel accumulations on a large segment of the landscape could promote an initiating fire to spread into fragile habitat.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

As stated above, prescribed fire is used to meet two general objectives: hazard fuel reduction and resource management. Burning hazardous fuels under controlled conditions emulate the natural process as well as is cost effective. Similarly, using fire for resource management emulates a natural process. The uniform approach to hazard fuel reduction minimizes the risk for fires to spread onto the Monument interior.

Alternative C: Full Suppression, No Prescribed Fire

Reliance on both mechanical and chemical treatments can cause damage to the landscape as equipment is used on fragile soils and has environmental consequences as chemicals are introduced into the environment. Because these processes are both labor intensive and costly, the potential for failure to complete a treatment is high. The resultant accumulation of fuel may promote an unwanted fire to spread onto Monument land.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

This ecosystem generates hazardous fuels annually. Failure to remove these hazards may allow an initiating fire to easily spread onto any part of the Monument landscape. The resultant wildland fires will be larger, increasing the likelihood that a point will experience a shorter fire free interval, and change the biological diversity as fire intolerant species are removed.

CUMULATIVE IMPACTS

Alternative A: Full Suppression, Mechanical treatment, Prescribed Fire on Saddle Mountain Unit Only (No Action)

Implementing this alternative would have both positive and negative impacts on Monument resources. Suppression would benefit the predominantly native communities, by creating a longer fire return interval that more closely resembles the historic fire regime. This would benefit monument/refuge management projects aimed at restoration of the native plants and ecosystem structure. This would also benefit monument/refuge objectives for preservation of historic, cultural, visual, aesthetic and recreation resources. Suppression activities would result in localized adverse resource impacts from firelines and other activities. But these impacts would be potentially mitigated by preventing fire over large areas, and rehabilitating areas damaged through suppression efforts.

Mechanical treatments could be used to maintain fire breaks to prevent fire, and to reduce fuel loads in localized areas. These treatments augment efforts of the monument/refuge management to control non-native, invasive species and to reduce build up of vegetation along road ways and in public use areas, such as parking lots. The negative impact from this on monument/refuge operations is that it requires a large amount of labor and expense. Personnel would have to invest large amounts of time to mechanically treat fuels, or be taken off other tasks to conduct fuel reduction operations.

In the Saddle Mountain Unit only, prescribed fire could be used to reduce hazardous fuels accumulation, maintain fire breaks, eliminate exotic vegetation, restore native communities, improve wildlife habitat, and restore and maintain the historic landscape. Across the rest of the monument, particularly areas affected by non-native, invasive plant species, suppression combined with the lack of prescribed fire would create a gradual and unnatural increase in fuel accumulations leading to increased potential of wildland fires of greater size and intensities than would occur under natural fire regimes. The potential for inadvertent wildlife habitat destruction could occur from large catastrophic fires and fire suppression activities. Repeated large fires will continue to reduce the native plant cover, increase non-native plant communities, decrease the biodiversity of the site and cause degradation of the intact ecosystems represented on the monument. This alternative would increase the potential for severe episodes of air pollution due to accumulated fuels, especially given that wildland fires often occur simultaneously region-wide. The potential for large, high intensity fires further contributes to vegetation and land impacts with associated runoff to hydrologic resources, again with simultaneous fires region-wide increasing the magnitude of the effect. There would be an increased possibility of destruction of existing and previously unrecorded cultural resources. Risk to historic structures increases as the chance for a catastrophic fire increases. The occurrence of catastrophic fires resulting from high fuel loadings poses a threat to the safety of both firefighters and the public. The potential of threat to life and property rises. As fire hazards increase due to the continuing buildup of fuels, the magnitude of the suppression effort would rise as would associated suppression costs. This alternative would limit the monument manager in the ability to protect the objects of antiquity for which the monument was established.

Alternative B: Full Suppression, Mechanical treatment, Prescribed Fire on All Monument/Refuge Units (Proposed Action)

No adverse cumulative impacts would be expected from the Proposed Action alternative. Suppression efforts would be employed to limit damage to resources from unplanned wildland fire. Suppression would benefit the predominantly native communities, by creating a longer fire return interval that more closely resembles the historic fire regime. This would benefit monument management projects aimed at restoration of the native plants and ecosystem structure. This would also benefit monument objectives for preservation of historic and cultural

resources, and visual, aesthetic and recreation resources. Suppression activities would result in localized adverse resource impacts from firelines, helispot construction and other activities. But these impacts would be potentially mitigated by preventing fire over large areas, and rehabilitating areas damaged through suppression efforts.

Mechanical treatments could be applied throughout the monument as in Alternative A, Cumulative Impacts. The use of mechanical treatments to prepare prescribed fire areas would expand to include the entire monument. Mechanical fuels reduction would augment other monument programs for vegetation management, including non-native and invasive plant species control. Mechanical preparations could also enhance monument restoration programs.

Expanded prescribed fire would give the monument managers the greatest flexibility to reestablish the natural fire regime of the monument/refuge, to reduce hazardous fuels accumulation, maintain fire breaks, eliminate exotic vegetation, restore native communities, improve wildlife habitat, and restore and maintain the historic landscape. Fire could be used to reduce un-wanted vegetation, and to improve native vegetative communities, when necessary. As stated above, prescribed burns could be planned to have little impact on biological resources, cultural resources, visual and recreation resources. These practices will reduce the chance of a large, destructive wildland fire causing widespread resource damage. The historical fire regime could begin to be re-established with smaller, low intensity prescribed fires. Monument management activities such as vegetation control, wildlife habitat improvement and restoration would be enhanced through the ability to use prescribed fire.

Local air quality would be affected for short periods of time during prescribed burns, with air quality returning to normal following the completion of burning. Effects of smoke from prescribed fires throughout the basin may be mitigated with careful planning. Particulate matter would be the primary pollutant with localized effects. The controlled nature of these burns would make the effect on air quality much less severe than from catastrophic wildland fires. Similarly, impacts to water quality from surface runoff would be reduced when compared to the other alternatives. There should be little or no long- or short- term changes in soils within the prescribed burn areas. Some erosive effects would result from the construction of firelines and other ground disturbing activities. There is a potential safety problem from prescribed fires that might cross control lines, but back-up resources would be notified and available for continency response.

This alternative would allow the monument managers the greatest flexibility in protection of the objects of antiquity for which the monument was established. Management actions could be designed to meet established monument planning goals (when established), and to meet the following fire management goals; reduce hazardous fuels accumulation, maintain fire breaks, eliminate exotic vegetation, restore native communities, improve wildlife habitat, and restore and maintain the historic landscape.

Alternative C: Full Suppression, Mechanical Treatment, No Prescribed Fire

Under this alternative some cumulative impacts would be negative, particularly with respect to the ability to reduce hazardous fuels using mechanical treatments without prescribed fire.

Suppression would have similar cumulative effects as above in Alternatives A and B.

Mechanical treatments would be expanded to reduce hazardous fuels across the entire monument.

Mechanical treatments could be used to maintain fire breaks to prevent fire, and to reduce fuel loads in localized areas. The sheer size and nature of the monument makes fuel reduction over large areas difficult. The negative impact from this on monument/refuge operations is that it requires a large amount of labor and expense. Personnel would have to invest large amounts of time to mechanically treat fuels, or be taken off other tasks to conduct fuel reduction operations.

Fuels would most likely continue to build in many areas, and could lead to large fires.

Elimination of prescribed fire would allow build-up of excessive hazardous fuel loadings, encourage accumulation of vegetative debris, and would preclude improving plant vigor and rejuvenation and restoration of vegetative stands. Prescribed fire could not be used to simulate the ecological effects of natural fire, to reduce hazard fuels, to control non-native and invasive vegetation, or to prepare areas for restoration. Larger more destructive wildland fires would likely occur. The potential for inadvertent wildlife habitat destruction could occur from large catastrophic fires and fire suppression activities. Repeated large fires will continue to reduce the native plant cover, increase non-native plant communities, decrease the biodiversity of the site and cause degradation of the intact ecosystems represented on the monument.

This alternative would increase the potential for severe episodes of air pollution due to accumulated fuels, especially given that wildland fires often occur simultaneously region-wide. The potential for large, high intensity fires further contributes to vegetation and land impacts with associated runoff to hydrologic resources, again with simultaneous fires region-wide increasing the magnitude of the effect. There would be an increased possibility of damage and/or destruction of existing and previously unrecorded cultural resources. Risk to historic buildings increases as the chance for a catastrophic fire increases. The occurrence of catastrophic fires resulting from high fuel loadings poses a threat to the safety of both firefighters and the public. The potential of threat to life and property rises. As fire hazards increase due to the continuing buildup of fuels, the magnitude of the suppression effort would rise as would associated suppression costs. This alternative would limit the monument manager in the ability to protect the objects of antiquity for which the monument was established.

Alternative D: Full Suppression, No Mechanical Treatment, No prescribed fire

Under this alternative wildland fires would be suppressed, but no mechanical or prescribed fire would be used. Elmination of mechanical treatments and prescribed fire would allow build-up of excessive hazardous fuel loadings, encourage accumulation of vegetative debris, and would preclude improving plant vigor and rejuvenation and restoration of vegetative stands. Prescribed fire could not be used to simulate the ecological effects of natural fire, to reduce hazard fuels, to control non-native and invasive vegetation, or to prepare areas for restoration. Larger more destructive wildland fires would likely occur. The potential for inadvertent wildlife habitat destruction could occur from large catastrophic fires and associated fire suppression activities. Repeated large fires will continue to reduce the native plant cover, increase non-native plant communities, decrease the biodiversity of the site and cause degradation of the intact ecosystems represented on the monument.

This alternative would increase the potential for severe episodes of air pollution due to accumulated fuels, especially given that wildland fires often occur simultaneously region-wide. The potential for large, high intensity fires further contributes to vegetation and land impacts with associated runoff to hydrologic resources, again with simultaneous fires region-wide increasing the magnitude of the effect. There would be an increased possibility of damage and/ordestruction of existing and previously unrecorded cultural resources. Risk to historic buildings increases as the chance for a catastrophic fire increases. The occurrence of catastrophic fires resulting from high

fuel loadings poses a threat to the safety of both firefighters and the public. The potential of threat to life and property rises. As fire hazards increase due to the continuing buildup of fuels, the magnitude of the suppression effort would rise as would associated suppression costs. This alternative would limit the monument manager in the ability to protect the objects of antiquity for which the monument was established.

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